

MOTREC



E-480SC



OPERATOR AND MAINTENANCE MANUAL SPARE PARTS LISTS INCLUDED
--

SERIAL NUMBER : 1038854 & UP

Printed in Canada

One Year Limited Warranty

Effective April 25, 2005, MOTREC, Inc. (MOTREC) hereby warrants to the Original Retail Purchaser (Owner) that any of its vehicles shall be free from any defect in materials for a period of 90 DAYS while in the possession of such Original Retail Purchaser. This warranty IS NOT TRANSFERABLE to any subsequent Buyer.

The warranty period is extended to one year or one thousand (1,000) hours, which ever first occurs, on the electric motor, differential (parts that bathe in oil) and the electronic speed controller. MOTREC makes no warranty or representation with respect to the internal combustion engine, tires and batteries, since their respective manufacturers cover such parts. Accessories (light, gage, horn, etc), electrical contacts (switch, solenoid, contactor, relay), diodes & fuses, belts & pulleys, filters & spark plugs, lubricants, brake linings & shoes, brake drums & discs, seals, seats, trim and other items subject to wear are not included in this warranty; nor is any item that in MOTREC sole opinion, shows evidence of neglect, misuse, abuse, collision or alteration.

This warranty shall not apply to normal maintenance requirements as described in the User Manual, and to damages during shipment. The latter is the carrier's responsibility. No compensation will be allowed for delays.

To initiate warranty coverage on any MOTREC vehicle, the Dealer must complete and return the "Sales/Installation Report" to MOTREC within 30 days after delivery to the Original Retail Purchaser; or within 90 days after the delivery date to the Dealer, which ever occurs first. Failure to follow these procedures will result in considering the warranty coverage effective as of the shipment date from the factory.

The defective vehicle must be returned, at the Owner's expense, to an authorised MOTREC Dealer within 30 days after failure. The Owner will not be charged for parts and labour required for warranty repairs, which must be performed by an authorised MOTREC Dealer only. The vehicle will be returned at the owner's expense. The Warranty Claim Forms must be completed and returned with the defective part(s) to MOTREC within 30 days after repair was done. No compensation will be allowed for damages caused by vehicle downtime.

It is the responsibility of the owner of the vehicle to make sure that the driver is properly trained and instructed in the safety features and operation of the vehicle, including vehicle stability, as required by OSHA and ANSI-B56. Operators shall read, understand and follow the safety and operating instructions in MOTREC Manual before driving the vehicle. Operators shall not be permitted to drive the vehicle unless a complete and adequate training has been provided. Driving a vehicle constitutes a hazard. The driver is responsible for the control of the vehicle while driving and must always evaluate and care for all peculiar situations that he or she may meet while driving. The driver assumes the inherent hazards related to this activity. The vehicle is designed for off-road use only. MOTREC disclaims any liability for incidental or consequential damages, to include, but not be limited to, personal injury or property damage arising from vehicle misuse, lack of maintenance or any defect in the vehicle.

It is the responsibility of the Owner of the vehicle to make sure that the service technicians are properly trained as required by OSHA and ANSI-B56. Service technicians shall read, understand and follow instructions in the MOTREC manual before servicing the vehicle. Only qualified and authorized personnel shall be permitted to maintain, repair, adjust and inspect the vehicle.

MOTREC prohibits, and disclaims responsibility for, any vehicle modification altering the weight distribution and stability, increasing the speed or affecting the safety of the vehicle. Such modifications can cause serious personal injury or property damage for which MOTREC disclaims any responsibility.

For Owners that are located outside North America, the warranty period starts the date of shipment from the factory, and the defective parts must be returned at the Owner's expense to MOTREC prior to warranty repair.

IMPORTANT.....IMPORTANT.....IMPORTANT.....IMPORTANT

Real and follow safety and operating instructions

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WARNING

DO NOT perform preliminary installations, operate, service, replace, adjust or maintain equipment on this machine until you have thoroughly read and understood the Safety section of this manual, and have read and understood all the sections of this manual that apply to the job you are doing on this machine.

Failure to read all warnings posted on this machine and written in this manual, could cause death, serious injury or property damage.

SAFETY

SAFETY WARNINGS FOR OPERATORS

- FAILURE TO OBEY THE FOLLOWING SAFETY RULES MAIN RESULT IN SEVERE INJURY.
- It is the responsibility of the owner of this vehicle to train operators to ensure that they understand the operating characteristics of this vehicle, including training in vehicle stability, and obey the following safety rules and guidelines. Owner shall comply with OSHA and ASME/ANSI B56.8 & B56.9 regulations for vehicle use, safety rules, operator training and certification. Do not drive this vehicle unless you are a qualified operator.
- Do not drive this vehicle under the influence of drugs or alcohol.
- Do not drive this vehicle on public roads and highways. This vehicle is designed to be driven in buildings.
- The electrical system of this vehicle will make sparks which can ignite inflammable materials. Never use the vehicle in hazardous areas where there are inflammable materials, explosive dust or fumes in the air.
- Have your vehicle inspected regularly by trained personnel, and cease operation if a malfunction occurs.
- Do not open battery compartment to prevent battery explosion, acid splashing, severe damage to eyes or skin.
- Do not open motor compartment. Keep clear from moving, rotating(wheels, sheaves, etc) or lifting parts.
- Never carry more passengers than number allowed for this vehicle. Wait until all occupants are seated and holding on before moving. Always keep all body parts inside vehicle. Keep both hands on steering wheel.
- Do not exceed the vehicle cargo load capacity and gross trailing weight capacity, rated for flat hard even surface. Different operating conditions such as loose terrain or ramps reduce vehicle capacity.
- Avoid loose, unbalanced or top-heavy loads to keep a good stability and prevent overturn. Do not load cargo that can fall off the vehicle. Do not carry cargo that is longer, wider or higher than this vehicle.
- Always depress slowly the accelerator for smooth acceleration. Avoid stunt driving or horseplay.
- Avoid sharp turns, always slow down before turning, to prevent vehicle overturn or trailer jack knife. Vehicle is more sensitive to overturn and jack knife when traveling on inclines or when carrying a heavy load.
- Always drive straight up and down the face of an incline, never across the face, to prevent overturn and trailer jack knife. Drive slower and start applying brakes sooner on inclines to adjust for longer stopping distance.
- Use extra care and drive slowly in reverse, in congested areas or on wet or slippery ground.
- Keep to the right under normal conditions. Maintain a safe distance from all objects.
- Slow down and sound the horn when approaching a corner or other blind intersections.
- Before leaving the vehicle, park on a level ground flat surface, turn off all switches, set the forward/reverse switch to neutral, set the parking brake, remove the key. Do not park the vehicle on an incline.
- Before battery charging, park the vehicle in a well ventilated area set for. Do not operate it when charging. To interrupt a charging cycle, disconnect the AC plug; disconnecting the DC plug or a battery terminal, or operating the vehicle, could damage the charger and produce a spark, battery explosion and acid splashing.
- Use another driver to steer this vehicle while it is towed. Be sure the driver uses brakes when you slow or stop the towing vehicle. Do not exceed 5 MPH or carry any passenger while towing this vehicle.

USE OF NOTES, CAUTIONS AND WARNINGS

NOTE – additional information to further explain instructions.

CAUTION – Failure to follow instruction could cause damage to equipment.

WARNING – Failure to follow instruction could cause death, personal injury and property damage.

DANGER – Failure to follow instruction will cause death, personal injury and property damage.

GENERAL OPERATING RULES, SAFETY AND LIMITATIONS

- Inspect machine before using. Do not use machine if it is not working properly in any way.
- Check job site for unsafe working conditions.
- Do not operate on uneven or soft terrain.
- Do not raise platform if machine is on an incline.
- Never carry people and/or cargo on platform while moving.
- Use machine only for purposes for which it was designed.
- Do not raise platform if stabilizers are not fully extended and lock.
- Do not exceed the load capacity of platform (1000 lbs) and the load capacity of extended deck (500 lbs)
- An operator of any type of work platform is subject to certain hazards that cannot be protected by mechanical means. It is therefore essential that operators be competent, careful, physically and mentally fit and thoroughly trained in safe operation of this machine.



DANGER

Do not operate machine near power lines. Platform and enclosures are not insulated. Failure to follow this warning could cause death or personal injury.

DANGER	
TIP-OVER HAZARDS	ELECTROCUTION HAZARD
DO NOT DRIVE NEAR DROP-OFFS, HOLES, OPEN ELEVATOR SHAFTS, AND LOADING DOCKS.	THIS MACHINE IS NOT INSULATED. MAINTAIN SAFE CLEARANCES FROM ELECTRICAL POWER LINES AND APPARATUS. YOU MUST ALLOW FOR PLATFORM SWAY, ROCK, OR SAG. THIS WORK PLATFORM DOES NOT PROVIDE PROTECTION FROM CONTACT WITH OR PROXIMITY TO AN ELECTRICALLY CHARGED CONDUCTOR.
DO NOT RAISE PLATFORM ON UNEVEN OR SOFT SURFACES. DO NOT DRIVE ONTO UNEVEN OR SOFT SURFACES WHEN ELEVATED.	OTHER HAZARDS
DO NOT RAISE PLATFORM ON SLOPE OR DRIVE ONTO SLOPE WHEN ELEVATED.	- DO NOT OVERLOAD. - DO NOT USE WITHOUT RAILINGS AND ENTRY GATE/CHAIN/BAR IN PLACE. - DO NOT USE IF WORK PLATFORM IS NOT WORKING PROPERLY OR IF ANY PART IS DAMAGED OR WORN. - DO NOT USE NEAR MOVING VEHICLES OR CRANES. - DO NOT STAND OR SIT ON GUARDRAILS. - DO NOT USE UNDER THE INFLUENCE OF ALCOHOL OR DRUGS. - DO NOT OVERRIDE SAFETY DEVICES. - DO NOT LEAVE MACHINE UNATTENDED WITH KEY IN KEY SWITCH. - DO NOT RAISE PLATFORM WHILE MACHINE IS ON A TRUCK, FORK LIFT, OR OTHER DEVICE OR VEHICLE. - DO NOT USE LADDER, SCAFFOLDING, OR OTHER DEVICES TO INCREASE SIZE OR WORKING HEIGHT OF PLATFORM. - DO NOT USE WITH IMPROPERLY INFLATED TIRES. - DO NOT USE WITH DAMAGED WHEELS OR TIRES. - DO NOT USE WITH TIRES OR TIRE FILLS THAT ARE NOT PER MANUFACTURER'S SPECIFICATIONS. REFER TO MAINTENANCE MANUAL.
DO NOT RAISE PLATFORM IN WINDY OR GUSTY CONDITIONS.	

PERSONNEL QUALIFICATIONS

- * Operation of E-480SC shall be restricted to certified personnel as required by OSHA.
- * Maintenance of E-480SC shall be restricted to qualified trained personnel as required by OSHA.
- * Before operation or maintenance, personnel shall read and thoroughly understand this manual. If a proposed operator or maintenance man fails to understand any segment of this manual, his Supervisor can clarify the misunderstanding through written correspondence or phone call to:

MOTREC inc, 200 Industial Boul. South, Bromptonville (Quebec) Canada, J0B 1H0

Phone: (819) 846-2010 ext: 226 Fax: (819) 846-3050

E-mail: info@motrec.ca Web site: www.motrec.com

SAFETY FEATURES

1. Platform won't move up if stabilizers are not fully extended.
Stabilizers won't disengage if platform is not fully down.
Vehicle won't travel if stabilizers are not fully retracted.
2. Emergency Stop: The emergency stop is located on the control console. Depress red knob as indicated and all functions of machine will be de-energized. Pull the knob to reactivate circuits (Figure 1).
3. Emergency Down
The emergency down control is located on the left side. Pull handle to allow platform to descend back to the stowed position (Figure 2).



Figure 1. Control Console Emergency Stop

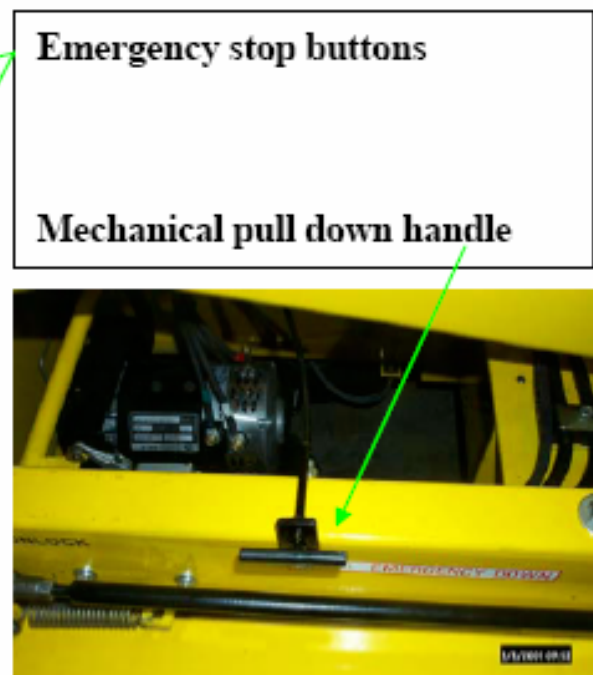


Figure 2. Emergency Down Handle

MAINTENACE LOCK



WARNING

MAINTENANCE LOCK MUST BE INSTALLED WHEN MAINTAINING OR SERVICING MACHINE WITH PLATFORM FULLY OR PARTIALLY EXTENDED.

Working through beams on scissors lifting device creates a hazardous situation which could cause death or personal injury. Whenever possible, perform maintenance through floorboards with the platform fully lowered or from the outside of the base.

FOLLOW MAINTENANCE LOCK PROCEDURE !

1. Remove load from platform.
2. Raise platform as high necessary to engage maintenance lock.
3. Maintenance lock is located at the rear of the unit between the inside beam assemblies. With machine raised part way, lift maintenance locks and lower machine so that pivot pins are resting on maintenance lock (Figure 3).

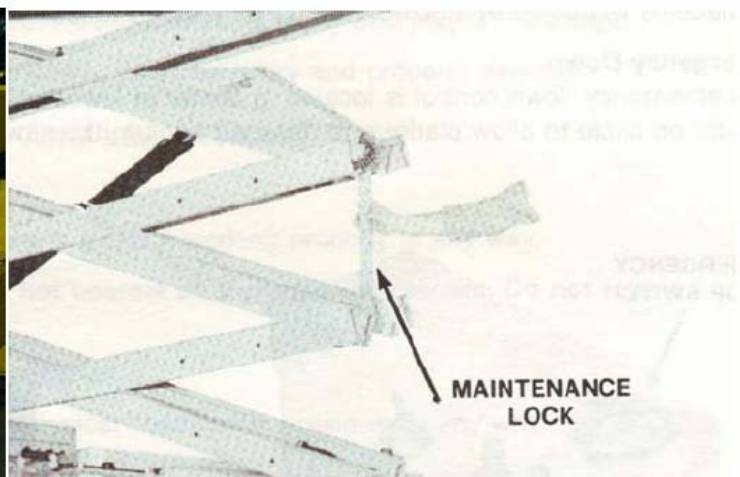


Figure 3. Positioning Maintenance Lock



WARNING

DO NOT SERVICE EXTENDED OR PARTIALLY EXTENDED MACHINE UNTIL THE ABOVE PROCEDURE IS FOLLOWED.

INTRODUCTION

DESCRIPTION

Motrec E-480SC is electrically driven, hydraulically operated units. The platform is raised and lowered by a scissors mechanism. Motrec E-480SC platform is raised by a hydraulic cylinder, which is controlled from the control console on the platform. Emergency lowering and auxiliary lift controls located at the base of the machine.

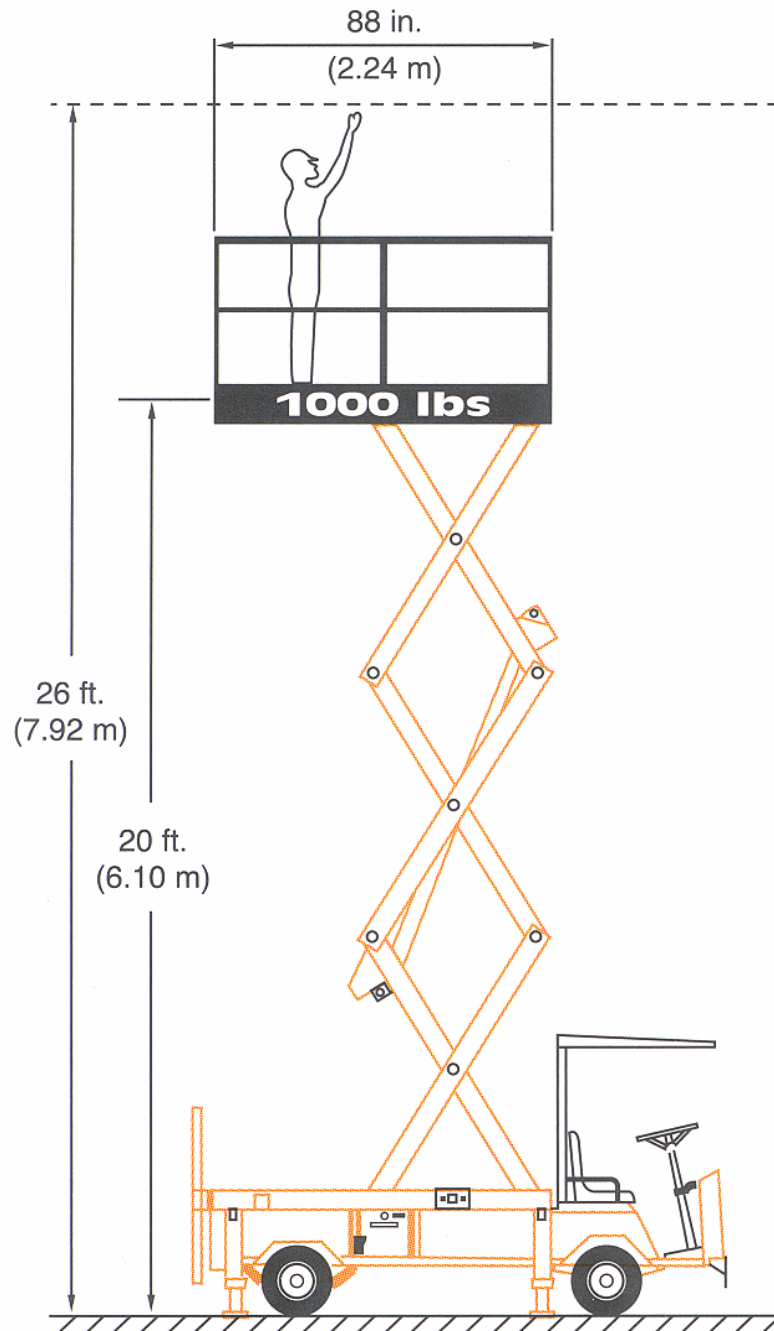


Figure 4. Motrec E-480SC

SPECIFICATIONS

Through our constant efforts to improve our products, specifications may change without notice.

E-480SC Mobile Lift

The E-480SC is engineered for large industrial plants that require rapid response over long distance. The E-480SC is ideal for warehouse, airport and in-plant uses. The E-480SC is the only vehicle of its kind and includes:

- Descent alarm and flashing light.
- 48 volt drive controls and accessories.
- 24 volt hydraulic controls and a 4HP pump.
- Eight 6V/220AH deep cycle batteries.
- Roll-out battery tray.
- 48V/25A Lestronic II charger.
- Automotive differential.
- Curtis-PMC electronic speed control
- Curtis 802 battery discharge indicator.
- 48V headlight, tail/brake lights and horn.
- Hydraulic disc brakes on all four wheels.
- Front and rear leaf spring suspension.
- 5.70 x 8 L.R.D. tires
- 1000 lbs platform capacity (500 lbs extended platform capacity).

The E-480SC carries two people up to 8 MPH for faster response to maintenance or emergency sites. It is fully self-contained and able to move over railroad crossings and rough terrain. This is due to its use of large tires and automotive leaf springs in the front and rear. Motrec even offers the availability of special boxes on the platform for airport and warehouse needs.

OPERATION

Description



WARNING

Before operating this machine, operator must carefully read the safety instructions in this manual. Failure to follow safety instructions may result in **severe injury or death**.

PRELIMINARY INSTALLATIONS

1. Remove all packing materials and inspect for possible damage during shipment. **Report any damage immediately to the person delivering the equipment.**
2. If side railings are not installed, install side railings on four sides of the platform. Pin front and rear rails to the sides with clevis pin provided. Check that platform extension slides freely, and gate swings freely.

NOTE

To install extending platform, refer to the extending platform illustration in this manual

3. Make sure carrying capacity and warning decals provided state correct capacity for your machine, and are installed to platform as illustrated.



Figure 5. Platform Railings and Warning Decal.

4. If not assembled before shipment, connect cable to control console provided and install console on platform railing. Pull emergency stop button if it has been depressed (Figure 6).
5. If wheels have not been installed, install them.
6. Pull emergency stop button on lower control station if it has been depressed (Figure 6).
7. Check oil level in hydraulic reservoir (see sight glass). See next page fill-up procedure.
8. Inspect machine for hydraulic oil leaks. Do not use the machine until leaks are serviced.

SCISSOR LIFT OPERATION PROCEDURE

9. Turn key switch at “lift” position.
10. Fully extend stabilizers using toggle switch at “stab” position at lower control station. Make sure legs will stand on even surface.
11. Move up platform using toggle switch at “up” position at lower control station or using toggle switch “up” position* (upper control station). To stop platform movement, release the toggle.

***If you have 2-speed option: Lower station default is “up fast” while upper station default is “upslow”, Simply press “upslow” switch and “fast” button at the same time to get “upfast” function.**

*** UPPER STATION**



LOWER CONTROL STATION

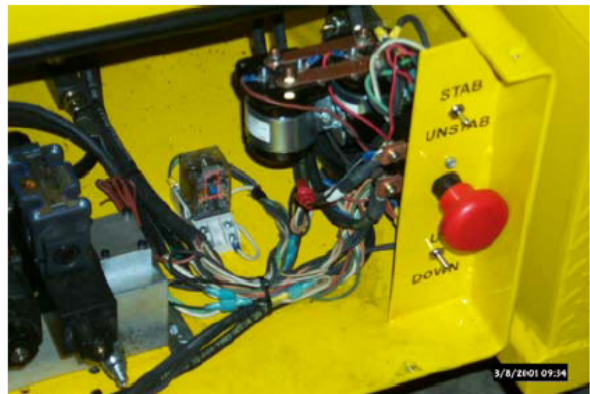


Figure 6. Controls

12. **MAKE SURE MAINTENANCE LOCK IS SECURELY POSITIONED ON ITS SUPPORT AND WON'T DISTURB BEAM MOVEMENT.**
13. Use toggle switch at “down” position to move platform downward (any station). To stop platform movement, release the toggle.

TO MOVE VEHICLE

14. **To unlock stabilizers, activate stab switch and pull unlock lever. Keep pulling lever while activating unstab switch to retract stabilizers.**

If lever is a little bit hard to actuate, simply press STAB switch for a while at lower control station then apply sufficient force to actuate UNLOCK main lever



Figure 7. Unlock main lever

15. When stabilizers are fully retracted, sit down, turn key switch at F/R position to move vehicle, set F/R switch for direction.

NOTE: Stabilizers must be fully extended to operate the platform; or fully retract to move vehicle forward/reverse. If the platform is partly raised, stabilizers cannot be activated.

HYDRAULIC OIL FILL-UP PROCEDURE

- Lower platform so that maintenance lock is resting on pivot pin.



WARNING

Maintenance lock must be installed when maintaining or servicing machine with platform fully or partially extended. Working through beams on scissors lifting device creates a hazardous situation which could cause death or personal injury. Follow maintenance lock procedure on page 3 of this manual

- Remove filler cap and check fluid reservoir. Fill to proper level using AWE32 hydraulic oil.
- Replace filler cap. Raise platform slightly and retract maintenance lock.
- Inspect hydraulic system for leaks. Check oil leakage at leg bottom hole.



WARNING

Never inspect hydraulic hoses with hands. Escaping fluids under pressure can cause serious injury. Use a piece of cardboard or other material to inspect for leaks. Escaping fluid under pressure can be invisible and can penetrate the skin and cause serious injury. If any fluid is injected into your skin, see a doctor at once! Injected fluid must be surgically removed by a doctor familiar with this type of injury or gangrene may result.

OPERATING INSTRUCTIONS

It is the responsibility of the owner of this vehicle to ensure that the operator understands the operating characteristics of this vehicle, and obeys the safety instructions (ANSI B56).

Do not drive this vehicle unless you are a qualified operator.

BEFORE USING VEHICLE

Before turning on key switch: set to neutral, check for any visible damage, check brake pedal.

BATTERIES

Never open the battery compartment unless you have received proper training for battery maintenance. Batteries emit explosive hydrogen gas that can be ignited by a spark or loose terminal. Battery acid causes severe damage to eyes or skin. Flush the contaminated area immediately with water.

BATTERY CHARGER

Park the vehicle in a well ventilated area for battery charging. Most battery chargers come with an electronic control that starts when the charger is plugged and stop when the battery is fully charged. To interrupt the charging cycle, disconnect the AC-plug, do not disconnect the DC plug.

BATTERY DISCHARGE INDICATOR

The green light moves from right to left as batteries are being discharged. When the green light is at the last position on the left the batteries must be recharged. A flashing light warns the operator that further discharge will damage batteries. See HOBBS indicator instructions

KEYSWITCH/LIGHTS

Three positions with off at center. Depress brake pedal and turn the key switch clockwise for F/R position and turn headlight on. Turn key switch clockwise to operate the platform. Always turn off all switches, set the F/R selector to neutral, set the parking brake, and remove the key before leaving the vehicle.

HORN

Depress the horn button on the steering column or handle bar.

F/R SWITCH

Three positions with neutral at center. Depress the front part of the rocker switch for forward direction. Depress the rear part of the rocker switch for reverse direction. Always set switch to neutral, turn off all switches, set the parking brake, and remove the key before leaving the vehicle.

ACCELERATOR PEDAL

It is designed for right foot operation only, and controls the speed of the vehicle.

FOOT BRAKE PEDAL

It is designed for right foot operation only. The brake force is proportional to the pressure on the pedal.

PARKING BRAKE

Pull handbrake lever to apply. Never park the vehicle on an incline. Always turn off all switches, set the F/R selector to neutral, set the parking brake, and remove the key before leaving the vehicle.

CONTROLS IDENTIFICATION – PLATFORM

EMERGENCY PUSH BUTTON SWITCH

Pull the emergency stop button on the lower control station to turn ON platform.
This switch cuts all power to the platform when it is pushed.
Pull the emergency stop button on the upper control box for UP/DOWN operation.

STABILIZERS

The stabilizer control switch is located on lower control station.

FOLD DOWN GUARDS

Before lifting the platform, raise the guards and lock with pins at each corner.

EXTENDING PLATFORM

Remove the lock pin, push the platform forward and lock with pin. (Figure 8)

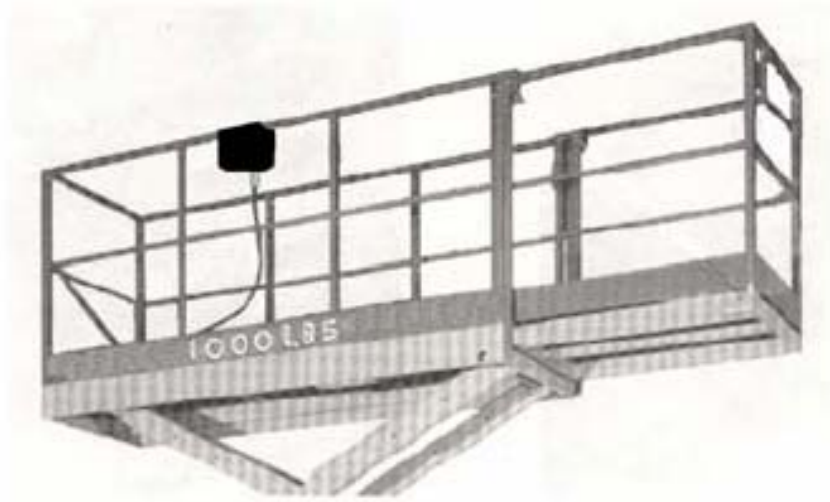


Figure 8. Extended platform

UP/DOWN

Stabilizers must be fully extended. UP/DOWN switches are located on the upper control box and the lower control station. Manual down control handle is located on the left side.

MAINTENANCE

SAFETY WARNINGS FOR SERVICE TECHNICIANS

FAILURE TO OBEY THE FOLLOWING SAFETY RULES MAIN RESULT IN SEVERE INJURY.

Owner shall comply with OSHA and ASME/ANSI B56.8 & B56.9 regulations for vehicle maintenance.

Only qualified and authorized personnel shall be permitted to maintain, repair, adjust and inspect carriers, vehicles, tractors, and batteries.

Before any maintenance work, park the vehicle on flat level surface, turn off all switches, remove key, lift wheels off the ground and secure with jack stands of adequate capacity. Don't connect charger.

Keep clear from moving parts such as tires, sheaves and motor.

Follow the maintenance instructions applicable to the type of repair, maintenance, or service.

Always wear a face shield and gloves when working around batteries.

Before opening the battery compartment, disconnect the charger, turn off all switches and remove the key. Batteries emit highly explosive gases which greatly increase when charging; do not disturb connections or produce sparks around batteries to avoid a battery explosion and acid splashing. Battery acid causes severe damage to eyes or skin. Flush contaminated area immediately with water.

Use insulated tools to avoid sparks that can cause battery explosion and acid splashing.

Use two counteracting tools, double-wrench technique, when disconnecting or tightening terminals on the battery and the speed controller to avoid cracking the terminal or battery post welds.

Before cleaning or replacing a battery, charger, speed controller, contactor, relay, diode, or any other component in the power circuit, always disconnect the charger, turn off all switches, remove the key, wear a face shield and gloves, identify battery polarity and disconnect battery leads, discharge the capacitor in the controller with a 10 ohms, 25 W resistor for a few seconds across B+ and B-.

After cleaning, the power must not be reapplied until terminal areas are thoroughly dry.

On EE-Rated vehicles make sure that the control box is sealed, the static strap makes good contact with the ground, the motor is sealed by bands, the cable protectors are properly installed.

Keep cables and wires clear from mechanical and rubbing action. Make sure that cable insulation is free from cutting or visible damage. Make sure that EE-Rated cable protectors are properly installed.

Before replacing a fuse or circuit breaker, identify the cause of failure and repair.

Programmable controllers must be programmed using the parameter settings in this service manual, before connecting the motor, to avoid sudden vehicle movement and accident.

Do not try to increase motor speed by changing parameter settings in the speed controller; it can cause accident and severe damage to the motor.

SEPEX speed controls are protected by a diode in the power circuit to filter inductive loads in the event of a sudden power interrupt. Some speed controllers require a diode to filter inductive loads on the KSI input. Removing the diodes will cause the speed control failure.

Before resuming maintenance operations, inspect safety warnings stickers and replace any if damage is found and part of the text can't be read.

DECALS AND LABELS

! CAUTION !

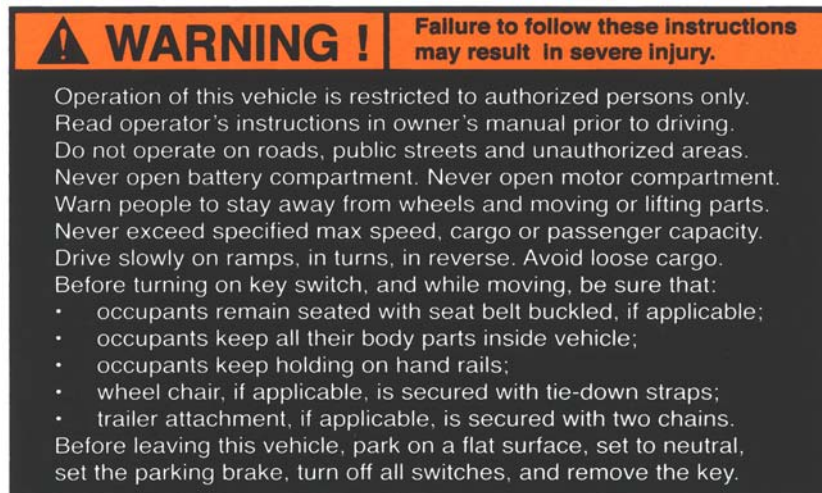
The images included in this section depict the decals/markings installed on the vehicle. It is of the utmost importance that these decals/markings remain unaltered and readable. Else, the sticker or the part bearing the marking has to be replaced.

Dashboard security warning label:



#5100000002

General security warning label:



#5100000001

Operators Check List

Inspect and/or test the following daily or at the beginning of each shift:

- | | |
|---|--|
| <u>1.</u> Operating and emergency controls. | <u>2.</u> Safety devices. |
| <u>3.</u> Personal protective devices. | <u>4.</u> Tires and wheels. |
| <u>5.</u> Outriggers (if equipped) and other structures. | <u>6.</u> Air, hydraulic and fuel system(s) for leaks. |
| <u>7.</u> Loose or missing parts. | <u>8.</u> Cables and wiring harnesses. |
| <u>9.</u> Placards, warnings, control markings and operating manual(s). | <u>10.</u> Guardrail system. |
| <u>11.</u> Engine oil level (if so equipped). | <u>12.</u> Battery fluid level. |
| <u>13.</u> Hydraulic reservoir level. | <u>14.</u> Coolant level (if so equipped). |

A

106691AB

#4800012D

THIS ELEVATING WORK PLATFORM HAS BEEN DESIGNED AND TESTED TO THE FOLLOWING REQUIREMENTS:

ANSI/SIA A92.6-1990

CSA CAN3-B354.2 OR .3-M82

OHSAS 1819-91

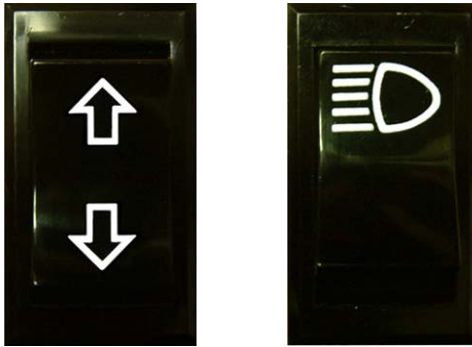
AS 1418.10-1996

IT IS THE RESPONSIBILITY OF DEALERS, OWNERS, USERS, OPERATORS, LESSORS, LESSEES TO CONFORM TO THE APPLICABLE SAFETY REGULATIONS FOR THE OPERATION OF THIS ELEVATING WORK PLATFORM.

108665AC

#4800012O

Respectively, forward/reverse selector and light switch marking:



Key switch marking:

LIFT F/R

#4800012S

Scissor security warning labels (located on both side):

KEEP CLEAR

#4800012L



Striped marking tape 4" #4800012W

Stabilizers security warning label (Each faces, sides and rear):



Striped marking tape 3" # 30102

Platform capacity warning labels (located on both side):

1000 LBS MAX. CAP.

#4800012M



Striped marking tape 4" #4800012W

Extending Platform capacity and security warning labels (located on rear end):

500 LBS MAX. CAP.

#4800012N

DANGER	
TIP-OVER HAZARDS  DO NOT DRIVE NEAR DROP-OFFS, HOLES, OPEN ELEVATOR SHAFTS, AND LOADING DOCKS.	ELECTROCUTION HAZARD  THIS MACHINE IS NOT INSULATED. MAINTAIN SAFE CLEARANCES FROM ELECTRICAL POWER LINES AND APPARATUS. YOU MUST ALLOW FOR PLATFORM SWAY, ROCK, OR SAG. THIS WORK PLATFORM DOES NOT PROVIDE PROTECTION FROM CONTACT WITH OR PROXIMITY TO AN ELECTRICALLY CHARGED CONDUCTOR.
 DO NOT RAISE PLATFORM ON UNEVEN OR SOFT SURFACES. DO NOT DRIVE ONTO UNEVEN OR SOFT SURFACES WHEN ELEVATED.	OTHER HAZARDS 1. DO NOT OVERLOAD. 2. DO NOT USE WITHOUT RAILINGS AND ENTRY GATE/CHAIN/BAR IN PLACE. 3. DO NOT USE IF WORK PLATFORM IS NOT WORKING PROPERLY OR IF ANY PART IS DAMAGED OR WORN. 4. DO NOT USE NEAR MOVING VEHICLES OR CRANES. 5. DO NOT STAND OR SIT ON GUARDRAILS. 6. DO NOT USE UNDER THE INFLUENCE OF ALCOHOL OR DRUGS. 7. DO NOT OVERRIDE SAFETY DEVICES. 8. DO NOT LEAVE MACHINE UNATTENDED WITH KEY IN KEY SWITCH. 9. DO NOT RAISE PLATFORM WHILE MACHINE IS ON A TRUCK, FORK LIFT, OR OTHER DEVICE OR VEHICLE. 10. DO NOT USE LADDER, SCAFFOLDING, OR OTHER DEVICES TO INCREASE SIZE OR WORKING HEIGHT OF PLATFORM. 11. DO NOT USE WITH IMPROPERLY INFLATED TIRES. 12. DO NOT USE WITH DAMAGED WHEELS OR TIRES. 13. DO NOT USE WITH TIRES OR TIRE FILLS THAT ARE NOT PER MANUFACTURER'S SPECIFICATIONS. REFER TO MAINTENANCE MANUAL.
 DO NOT RAISE PLATFORM ON SLOPE OR DRIVE ONTO SLOPE WHEN ELEVATED.	
 DO NOT RAISE PLATFORM IN WINDY OR GUSTY CONDITIONS.	

#4800012X

Security warning label on platform control box:



SJ 102661

#4800012E (located on the top of box)

UP DOWN

#4800012Q

STOP

#4800012U

FAST

#4800012Z (Optional 2 speed up)

Maintenance Lock security warning label (Located at the rear end):



#4800012G

Lower control station labels:

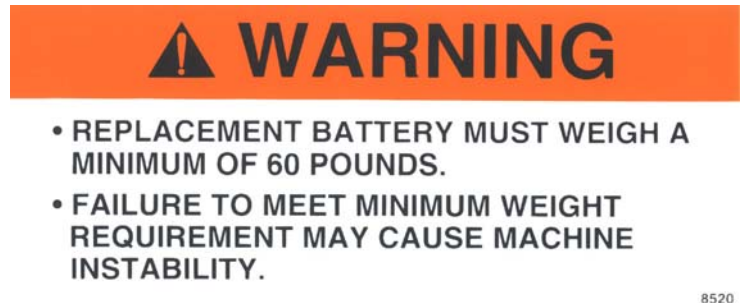
**STAB
UNSTAB**

#4800012R

**UP
DOWN**

#4800012T

Battery security warning labels:



#4800012H (Located on battery connector side).



4800012K (Located on top of battery tray, connector side).

BATTERY DISCONNECT

PULL



7248

#4800012J (Located near the battery connector).

Lower Railings security warning labels:



#4800012F (Located on left side, be on lower control station).



#4800012A (Located on left side, beside emergency down handle).

UNLOCK

#4800012V (Located on left side, beside unlock main lever).



THIS WORK PLATFORM TO BE USED BY TRAINED AND AUTHORIZED OPERATORS ONLY. IT IS THE OPERATORS RESPONSIBILITY TO:

1. READ AND UNDERSTAND ALL CAUTION AND DANGER WARNINGS AND OPERATING MANUAL.
2. PERFORM DAILY MAINTENANCE INSPECTIONS.
3. HAVE ALL WORN OR DAMAGED PARTS REPLACED.
4. FASTEN ENTRY GATE/CHAIN/BAR.
5. USE WORK PLATFORM ONLY ON HARD LEVEL SURFACES.

OWNERS, USERS, AND OPERATORS ARE RESPONSIBLE FOR INSPECTIONS AND MAINTENANCE OF THIS MACHINE AS REQUIRED BY ANSI/SIA A92.6-1990, CSA CAN. 3-B354.2 (OR .3)-M82 AND THE OPERATING/MAINTENANCE AND PARTS MANUAL.

A

106695AA

#4800012P (Located on right side, in middle).

PERIODIC MAINTENANCE CHECKLIST

! WARNING !

Maintenance operations must be made by properly trained service technicians.

- Keep clear from moving parts such as tires, sheaves and motor.
- Check for all EE protections, when applicable, and keep cables and wires clear from mechanical and rubbing action
- Batteries contain sulphur acid that can cause severe burns on skin or eyes.
- When working around batteries, wear acid proof protective equipment: face shield and gloves.
- Use electrically insulated tools to avoid sparks that can cause battery explosion.
- Before any maintenance work, park the vehicle on a flat level surface, turn off all switches, remove the key, lift the wheels off the ground and secure with jack stands of adequate capacity, identify and disconnect battery leads. Don't connect the charger.

CHECK/PERFORM	PERIOD HOURS	DAY	WEEK 20	MONTH 50	QUART. 200	YEAR 1000	2 YEARS 2000
MECHANICAL DAMAGE, OIL LEAKS		X					
REVERSE ALARM, DEADMAN SWITCH		X					
STATIC STRAP, min 2" contact with ground		X					
TIRE PRESSURE, pressure rating on tire			X				
CHECK/FILL BATTERIES, add distilled water to cover plates. Fill to recommended level after batteries have been fully charged.			X				
WARNING DECALS & MARKINGS				X			
EE-Rated CABLE PROTECTORS, SEALED MOTOR, SEALED CONTROL BOX.				X			
MASTER CYLINDER FLUID (DOT 3)				X			
BRAKE PEDAL TRAVEL 2" (50 mm) maximum travel				X			
STEERING FOR PLAY				X			
PARKING BRAKE LEVER requires 10 lbs. (5 kg) force to apply				X			
BELTS AND PULLEYS -10 lbs (5kg). force for 1/8" (3mm) deflexion; -pulleys alignment, see procedure.					X		
CLEAN/TIGHTEN WIRE TERMINALS					X		
WASH BATTERY TOP WITH WATER					X		
MOTOR BRUSHES FOR WEAR -brushes must exceed holders					X		
ACCELERATOR ADJUSTMENT -1/8" (3 mm) travel to activate micro-switch; -0 to 50 ohms when micro-switch activated; -4500 to 5500 ohms with pedal down.					X		
HYDR. BRAKE LINES FOR LEAK					X		
STEERING ASSEMBLY, as instructed					X		
BRAKE MECHANICAL LINKAGES for wear & play					X		
BRAKE LININGS FOR WEAR 1/16" (1.5 mm) minimum lining thickness.					X		
LUBRICATE brake pedal pivots, steering column, ball joints and kingpins.					X		
OIL (SAE 30) LEVEL IN DIFFERENTIAL Before adding oil, check oil seals for leaks.					X		
FRONT WHEEL BEARINGS PLAY					X		
TIGHTEN NUTS/BOLTS, electric terminals; drive; steering; brakes; suspension; body.					X		
REPLACE DIFFERENTIAL OIL(SAE 30)						X	
CLEAN AND RE-PACK FRONT HUBS						X	
SERVICE DIFFERENTIAL, replace the three oil seals, wheel bearings, oil (SAE 30)							X

SCISSOR PERIODIC MAINTENANCE CHECKLIST

CHECK	PERIOD HOURS	DAY	WEEK 20	MONTH 50	QUART. 100	YEAR 1000
MECHANICAL DAMAGE -STABILIZERS -SCISSOR WELDMENTS -SCISSOR PIVOTS & SNAP RINGS -PLATFORM GUARDS -EXTENDING DECK		X				
ELECTRIC DAMAGE -CABLE THROUGH SCISSOR -CABLE TO UPPER BOX -CABLE ON LIFTING CYLINDER -UPPER CONTROL BOX -LOWER CONTROL STATION -STABILIZER LIMIT SWITCHES		X				
HYDRAULICS SYSTEM -CYLINDER AND DOWN VALVE BODY FOR LEAKS -FLUID LEVEL, AWE 32 -OIL FILTER PRESSURE GAUGE -OIL FILTER REPLACEMENT		X				X
SAFETY DECALS -CHECK IF MISSING -CHECK IF LEGIBLE		X				
LUBRICATE -SCISSOR -2 CYLINDER PINS				X		
PUMP MOTOR BRUSHES FOR WEAR -BRUSHES MUST EXCEED HOLDERS -BLOW OUT CARBON DUST					X	
CHECK / TIGHTEN -HYDRAULIC FITTINGS -NUTS / BOLTS** -TERMINALS -SCISSOR PIVOTS & SNAP RINGS -CYLINDER PINS -GUARDS					X	

TABLE 10. SCISSOR LIFT INSPECTION AND LUBRICATION SCHEDULE

**CAUTION**

**** if necessary, replace only with similar grade bolt**

SCISSOR LIFT INSPECTION AND LUBRICATION WEEKLY LOG

Check and Initial Every 15 Hours of USE or Weekly

COMPONENT

	MONTH												
	DAY												
	INITIAL												
BATTERY													
1. Clean Battery													
2. Coat Terminals													
HYDRAULIC SYSTEM													
1. Check Fluid Level AWE32													
2. Inspect Commutator and Brushes *	Date Last Checked _____												
3. Check Fittings													
SCISSOR SYSTEM													
1. Check for Damage													
DRIVE AND LIFT MECHANISMS													
1. Oil Steering Pivot Points													
2. Oil Brake Pivot Points													
3. Check All Fasteners													
MAIN FRAME													
1. Check Structure													
CONTROL SYSTEM													
1. Check Terminals and Plugs													
2. Check Cords													

*Check every 6 months

TABLE 11. SCISSOR LIFT INSPECTION AND LUBRICATION **WEEKL LOG.**

INSPECTION AND LUBRICATION

Structure Inspection

- 1- Check machine for bent structural members. (Beams, main frame, platform, pivot pins, etc.). Machines which have been overloaded could have bent members and fatigued pivot pins. Replace all bent members and pins to insure a safe operation machine.
- 2- Check bushings in scissor beams for or cracked welds. Replace beams if bushing welds are cracked or bushings elongated.



WARNING

All pivot areas of scissors and lift cylinder must be checked for wear. A loud scraping noise means the bushings are damaged and need replacing. Failure to do so will result in extensive damage to structural members and bushings which would create a hazardous condition and could result in injury or death to personnel.

Lubrication

- 1- The MOTREC E-480SC scissor lift contains several pivot pins or rollers that require lubrication (Figure 9).
- 2- Steering rod linkage pivot and joint also require lubrication.



Figure 9. Lubricate pivots.

ACCELERATOR

GEAR

- Remove the cover.
- Backlash between gears must be reduced to a minimum by sliding holder; use locktite 262 to lock the three screws.
- When the plastic gear is fully depressed a small backlash must remain between the gears.
- When the plastic gear is released its rear portion must not exceed the pedal case.

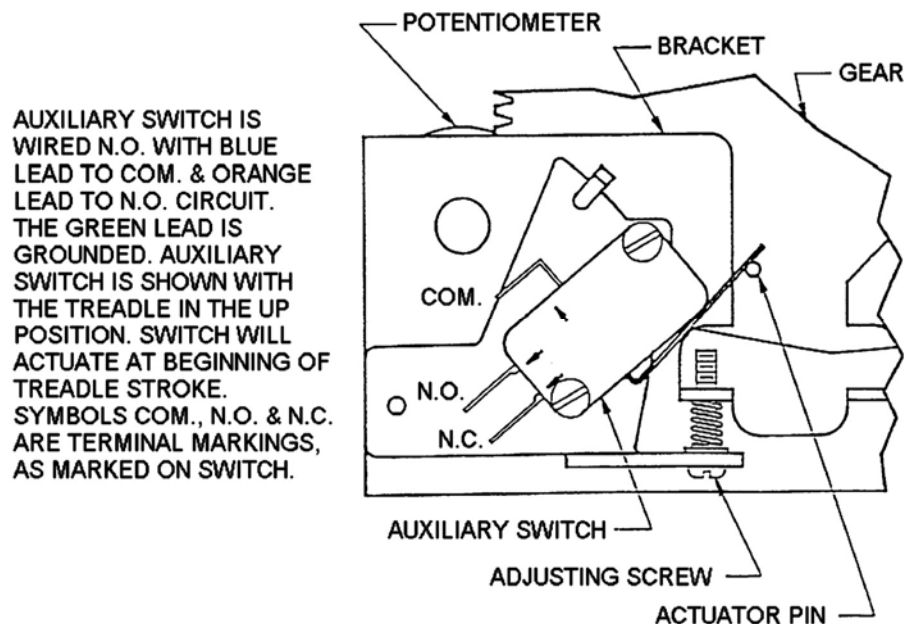
MICRO-SWITCH

The micro-switch must deactivate the on/off solenoid when the accelerator is released; turn the adjusting screw (shown on figure below) to adjust the micro-switch height.

POT

- Remove the terminals 2 and 3 on PMC to measure resistance signal.
- When the micro-switch is activated the signal must be less than 50 ohms. When the front portion of the pedal is fully depressed the signal must be more than 4600 ohms.
- To modify the resistance, turn the adjusting screw to change the micro-switch height (see figure below).

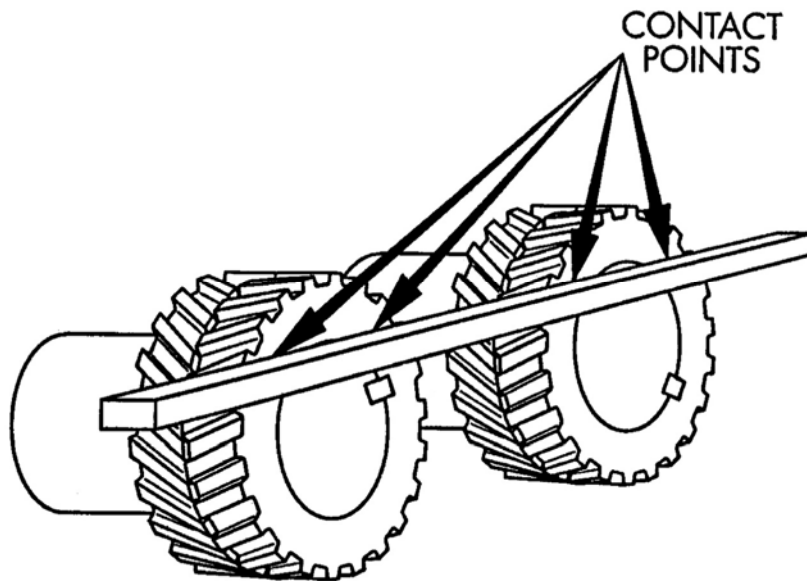
Proceed with the same verifications after the accelerator cover is on and then connect terminals 2 and 3.



BELT INSTALLATION AND TENSIONING

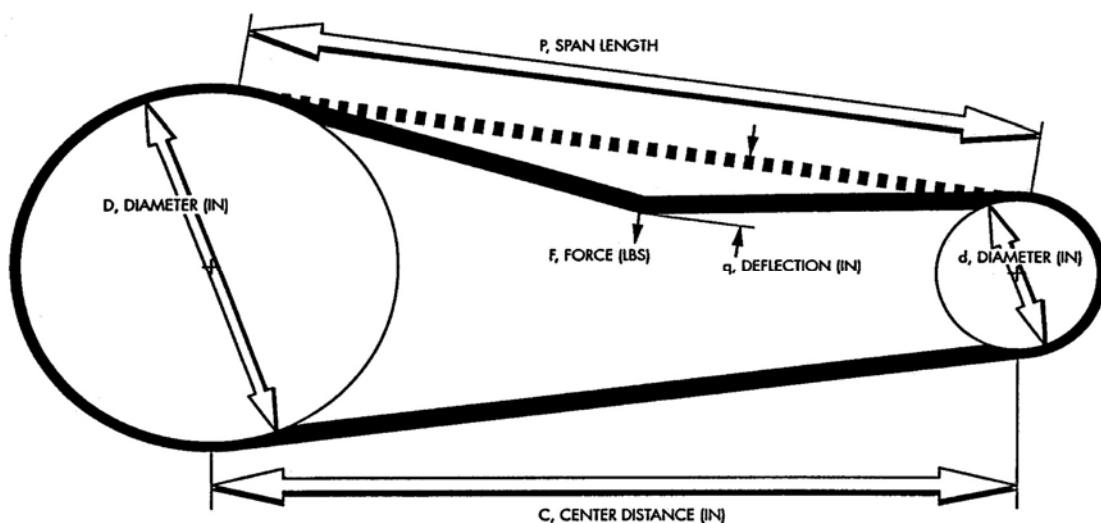
INSTALLATION

Adjust the sprockets using a straight edge. Slide up the edge on the larger pulley until it contacts the smaller pulley. Properly adjusted pulleys will provide three points of contact. Properly aligned pulleys will provide four points of contact. Tighten setscrews and recheck alignment.



TENSIONING

Check the force F required to provide a deflection of $1/8$ in. If the measured force is less than 15 lbs then lengthen centre distance C .



HYDRAULIC BRAKES

DRUM BRAKES

Remove brake drums and check linings wear; the linings should have a thickness exceeding 1/16" (1.5 mm). Turn the brake adjustment to reduce the clearance between lining and drum but avoid contact or drag when the wheels are turned and the pedal is released.

DISC BRAKES

Check pad linings for excessive wear; the linings should have a thickness exceeding 1/16" (1.5 mm). Disc brakes are self-adjusting.

BRAKE PEDAL

If the brake pedal becomes soft or spongy, air may have entered the hydraulic system and the brake system has to be bled:

1. fill the master cylinder with brake fluid (DOT-3);
2. bleed front callipers one at a time by having someone applying a steady pressure on the brake pedal, and close the bleeder before allowing the brake pedal to return to up position;
3. fill the master cylinder with brake fluid (DOT-3);
4. bleed rear wheel brakes one at a time, following the same procedure;
5. fill the master cylinder with brake fluid (DOT-3);
6. clean every fitting and line, remove traces of oil;
7. apply a continuous pressure on the brake pedal for about five minutes ;
8. Finally, inspect brake lines and fittings for leaks ;

FRONT AXLE AND STEERING

! CAUTION !

Before maintenance, turn off all switches, set to neutral, set parking brake, remove the key, and raise the front end of the vehicle supporting it with two jack stands of adequate capacity

STEERING INSPECTION

- Check tire inflation pressure, suspension components, tie rods straightness, tie rod ends play (wear), play (wear) in wheel bearings, kingpins and bushings.

REPLACING & ADJUSTING THE STEERING GEAR

- Remove the pitman arm;
- The steering box makes 6.5 turns, center the steering gear (3.25 turns from either side);
- Align the front wheel straight. Install the pitman arm.

TOE-IN ADJUSTEMENT

- With the wheels in straight forward direction, measure the inside (left to right) distance between the front tires, at the front and rear of the tires;
- Turn the rear tie rod until the distances are equal and tighten the two lock nuts on the tie rod.

REMOVING & GREASING OF FRONT HUBS, required once-a-year

- Remove dust cap and cutter pin, unscrew nut, remove hub;
- Inspect bearings and races for wear and replace worn bearings;
- Replace the seal;
- Pack the hub with wheel bearing grease and re-assemble.

ADJUSTING FRONT HUBS

- Tighten spindle nut to 30 ft-lb to seat the bearing and back off the nut to the next slot;
- Install a new cutter pin and the dust cap.

BATTERY MAINTENANCE

! WARNING !

- It is the responsibility of the owner of this vehicle to ensure that the service technicians are properly trained, read and obey the safety rules and guidelines in this manual (ANSI B56).
- Maintenance operations must be made by properly trained service technicians only.
- Before any maintenance work, park the vehicle on a flat level surface, turn off all the switches, set to neutral, remove the key, lift the wheels off the ground and secure with jack stands of adequate capacity.
- Keep charger disconnected while doing any maintenance work.
- Always wear a face shield and scarf when working around batteries.
- Battery emits highly explosive gases; do not produce sparks to avoid battery explosion and acid splashing. Battery acid causes severe damage to eyes or skin. Flush contaminated area immediately with water.
- Use insulated tools to avoid sparks that can cause battery explosion and acid splashing.
- Use two counteracting tools, double-wrench technique, when disconnecting or tightening battery posts.
- Before cleaning or replacing a battery, discharge the capacitor in the controller with a 10 ohms, 25 W resistor for a few seconds across B+ and B-, identify battery polarity and disconnect battery leads.
- After cleaning, the power must not be reapplied until terminal areas are thoroughly dry.

BATTERY LEADS AND CONNECTORS

Check for loose connections, damaged cables, acid spill, loose terminal posts, quarterly.

BATTERY POST CORROSION

If corrosion is present on battery posts, remove the cable connectors, use a wire brush to remove particles, and then clean them with a cloth that has been moistened with ammonia.

ELECTROLYTE LEVEL

Does not apply to sealed battery.

- Disconnect battery connectors on roll-out or lift-out installations.
- Make sure the battery roll-out tray is provided with stops before rolling out.
- Fill with distilled water.
- Daily charged batteries normally require watering once a week. Under watering leads to a shortened battery life. Over watering leads to battery corrosion. Be careful not to overfill any cell to avoid electrolyte to be forced out while charging.
- Fill each cell to plate level with distilled or de-ionized water, before battery charging. When the battery is charged, the fluid expands and can seep out if overfilled. Refill each cell after full charge, when the fluid has expanded to its maximum level.
- Reinstall battery caps before charging.

BATTERY MOUNTING

A loose battery increases damaging effects of vibrations and is more prone to short out.

BATTERY DISCHARGE LIMIT

Discharging below a 20% state of charge cuts down the battery life and the number of cycles available. At 20% state of charge, specific gravity of 6V battery should be 1180; and 1220 for industrial battery.

CHARGING AREA

- Always charge battery in a well ventilated area set for and approved for charging.
- Never leave a charger connected for more than 20 hours.

FREQUENCY OF CHARGE

- When a battery is discharged to its 20% state of charge, it is best to charge immediately.
- Batteries require a low current equalization charge (min 4 hours) at least every week, to equalize battery cells, improve battery performance and life in number of cycles.
- Never leave a charger connected for more than 20 hours.

STORAGE

- Keep the battery from getting cold, it would lose its capacity.
- Let the battery warm up before charging.
- Charge batteries in “stored” vehicles every month.

DEFECTIVE BATTERY

Check specific gravity of each cell; if a cell is shorted, voltage drop may occur only when there is current.

BATTERY CHARGER

! WARNING !

Always unplug the AC and DC electrical cords before attempting any repairs to the charger.

CHARGER DOES NOT TURN ON:

- Dc cord of portable chargers must be disconnected from batteries after every charge to restart;
- Check dc fuse links;
- Check battery voltage at the battery connector;
- Check ac outlet and cordset;
- Replace electronic control ;

RELAY CLOSSES AND TRANSFORMER HUMS BUT AMMETER DOES NOT REGISTER:

- Check dc fuse links;
- Check the continuity of the dc output cord, ammeter, diodes and all connections in the dc circuit;
- Check diodes;
- Check capacitor(rapidely increasing resistance);

SINGLE CHARGER FUSE BLOWS:

- Disconnect and check diodes;

BOTH FUSE LINKS BLOW:

- Check the battery pack and battery connector polarity;
- Disconnect and check diodes.

CHARGER OUTPUT IS LOW:

- Disconnect and check diodes;
- Can be caused by a transformer failure.

AMMETER READS 30 AMPS FOR MORE THAN 30 MINUTES:

- Check the battery pack;

CHARGER DOES NOT TURN OFF:

- Check specific gravity in each battery cell;
- As much as 16 hours may be required to properly charge heavily discharged new or cold batteries;
- Replace electronic control.

AC LINE FUSE OR CIRCUIT BREAKER BLOWS:

- Check ac cordset;
- Check ac line fuse rating;
- Replace electronic control;
- Can be caused by a transformer failure.

ELECTRICAL TROUBLESHOOTING

! WARNING !

Maintenance work must be performed by trained service technicians only.

It is the responsibility of the owner of this vehicle to ensure that the services technicians are properly trained, understand and obey the safety rules and guidelines (ANSI B56).

All service technicians must read and understand the maintenance warning section in this manual.

! WARNING !

Before any maintenance work, park the vehicle on a flat level surface, turn off all switches, remove the key, lift the wheels off the ground, secure with jack stands of adequate capacity, disconnect charger.

Always wear safety glasses.

Batteries emit highly explosive gases that can be ignited by a spark. Before disconnecting a high current terminal, turn off all switches, disconnect battery charger, disconnect batteries.

Keep clear from moving parts such as tires, sheaves and motor.

PMC SELF DIAGNOSTIC

If your PMC comes with a status led, use the flashing code to help troubleshooting.

BATTERY VOLTAGE

Make sure batteries are securely connected. Measure voltage between + and - terminals. We will call this value B+ or full battery voltage.

ACCESSORIES NOT WORKING

- Check the fuses on the batteries and the DC/DC converter.
- Check voltage across + and – terminals on the battery gage; if not B+, check wiring.
- Turn the key switch ON, check voltage between output terminal on the key switch and the - terminal on the battery gage; if not B+, replace the key switch.
- Check voltage across DC/DC converter output terminals; if not 12-Volt, replace the converter.
- Depress the accessory switch, check voltage across accessory terminals. If not 12-Volt, replace the switch. If 12-Volt, replace the accessory.

FORWARD ONLY

On a SEPEX motor control, check the reverse signal input on the controller.

On a series wound motor control, a bad reverse contactor is the most probable cause of the problem.

Switch to reverse and check voltage on the reverse control wire. If not B+, replace the F/R switch. If B+, turn off the key switch, disconnect batteries, disconnect power terminals on the F/R contactors, check the resistance across N.C. power terminals of the reverse contactor. If not 0 ohm, change the reverse contactor. If 0 ohms, switch to forward and check the resistance across the forward N.O. power terminals. If not 0 ohms, change the forward contactor.

REVERSE ONLY

On a SEPEX motor control, check the forward signal input on the controller.

On a series wound motor control, a bad forward contactor is the most probable cause of the problem. Switch to forward and check the voltage on the forward control wire. If not B+, replace the F/R switch. If B+, turn off the key switch, disconnect batteries, disconnect power terminals on the F/R contactors, check the resistance across N.C. power terminals of the forward contactor. If not 0 ohm, change the forward contactor. If 0 ohms, switch to reverse and check the resistance across the reverse N.O. power terminals. If not 0 ohms, change the reverse contactor.

TRAVEL AT REDUCED SPEED

Check batteries.

Turn off all switches and disconnect charger. Wear face shield and gloves. Do not disturb any battery connection to avoid sparks. Check the specific gravity of each cell. Cold batteries, highly discharged batteries or dead cells are the most frequent causes of reduced travel speed.

Check potentiometer.

Turn off the key switch, disconnect potentiometer terminals. Check the resistance between terminals.

Other causes of lower speed:

- dragging brakes;
- cold temperature (higher differential oil viscosity).

INTERMITTENT OPERATION

A bad potentiometer is the most probable cause of the following:

- acceleration is not constant;
- maximum speed is erratic;
- sudden stop after a bump or shock;
- erratic starts, requiring several pedal cycles.

A bad F/R contactor is also a probable cause of the following:

- sudden stop after a bump or shock;
- would not start to move at times.

Erratic starts could also be the cause of a misadjusted potentiometer or micro-switch; the pot signal must be less than 50 ohms when the micro-switch turns on.

PMC has an HPD safety feature that prevents the vehicle from moving if the accelerator pedal is depressed before the key switch is ON and seat switch is activated.

PMC may also have an SRO safety feature that prevents the vehicle from moving if the F/R switch is activated before turning on the key switch and activating the seat switch.

The vehicle stops on a steep and long ramp or while towing a heavy load: the circuit breaker has open to prevent motor overheating and will reset automatically after one minute. The PMC is also equipped with an internal thermal protection that cutback the current until the PMC has cooled down.

NO MOTION

Make sure that the PMC surface is clean and dry; check the terminal areas. Dust Particles or acid contamination, can create current leaks and cause a PMC malfunction.

Check F/R switch

Turn on the key switch and set to forward. Check voltage between the forward terminal and the – terminal on the battery gage, check voltage between the reverse terminal and the – terminal on the battery gage; if both B+, replace the F/R switch.

Check switches and wiring

Disconnect control terminals on the PMC and check all control signals. If a switch pin does not read B+, check wiring or replace the switch.

Check potentiometer

Turn the key switch to OFF, disconnect potentiometer terminals. Check the resistance across terminals: if not within the recommended limits, adjust or replace the potentiometer. Check for shorts between potentiometer wires and vehicle frame; resistance should read at least 1 megohm.

Check main contactor or solenoid

Check voltage across power terminals; if not B+, check circuit breaker or replace the solenoid.

Turn to on the key switch and activate the seat switch. Check voltage across the coil terminals; if not B+, check wiring and interlock switches. Check resistance across power terminals; if not 0 ohms, replace the solenoid.

Check circuit breaker and SEPEX DIODE

Before replacing the circuit breaker, check for shorts in the power circuit and check the SEPEX diode in the power circuit using a diode tester. If no such instrument is at hand, use an ohmmeter: the reading should be weak in one direction and strong in the other way.

Check the resistance across the circuit breaker. If not 0 ohms, replace the circuit breaker.

Check PMC

First disconnect battery B+ and B-, then PMC B+ and M-. Check the internal diode between B+ and M- terminals using a diode tester. If no such instrument is at hand, use an ohmmeter: the reading should be weak in one direction and strong in the other way. If the internal diode is defective, the PMC must be replaced.

Check the Motor

First disconnect battery B+ and B-, disconnect power terminals and check the motor armature and field for opens.

SCISSOR TROUBLESHOOTING

NO LIFT MOTION (pump not operating)

POSSIBLE CAUSES

1. Blown fuses.
2. Dead battery. Battery contacts.
3. Electrical circuit defective.
4. Worn brushes.
5. Shorted armature.
6. Defective motor contactor.
7. Defective emergency stop switch or coil.
8. Defective KEY switch.
9. Defective UP switch.

REPAIR PROCEDURES

1. Check fuse and replace if necessary.
2. -Check fuse and replace if necessary.
-Check and charge battery as directed in maintenance section.
-Check battery disconnects.
3. Refer to electrical schematic.
4. Replace brushes and springs.
5. Replace motor.
6. Replace contactor.
7. Replace switch or coil.
8. Replace KEY switch.
9. Replace UP switch.

NO FAST LIFT (pump not operating)

POSSIBLE CAUSES

1. Electrical circuit defective.
2. Worn brushes.
3. Defective motor contactor.
4. Defective pump relay coil or switch.

REPAIR PROCEDURE

1. Refer to electrical schematic.
2. Replace brushes and spring.
3. Replace contactor.
4. Replace pump relay coil or switch.

NO LIFT MOTION (pump not operating)

POSSIBLE CAUSES

1. Hydraulic fluid level low.
2. Pump cavitations caused by improper fluid for temperature conditions.
3. Defective up valve or coil.
4. Defective down valve or coil.
5. Electrical circuit defective.
6. Loose intake hose or filter.
7. Defective high-speed valve or solenoid.

REPAIR PROCEDURE

1. Add fluid (see Maintenance section).
2. Drain reservoir and bleed system. Use only recommended type fluids (see Maintenance section).
3. Replace up valve or coil.
4. Replace down valve or coil.
5. Refer to electrical schematic.
6. Tighten.
7. Replace high-speed valve or solenoid.

ASCENT SPEED SLOW OR ERRATIC

POSSIBLE CAUSES

1. Weak battery.
2. Loose connections in electrical circuitry.
3. Momentary short in wiring.
4. Bent structural members.
5. Restriction in hydraulic hose.
6. Defective or Jammed seals in hydraulic lift cylinder.
7. Gear or gear cavity worn or damaged.
8. Worn brushes valves.
9. Defective valves.
10. Defective high-speed valve or coil.
11. Loose intake hose or oil filter.
12. Defective down valve in manifold or in cylinder.
13. Defective emergency down valve.

REPAIR PROCEDURE

1. Charge battery (see Maintenance section).
2. Perform visual inspection and ensure all connections are secure.
3. Refer to electrical schematic.
4. Replace damaged members as necessary (see visual structural inspection in Maintenance section).
5. Replace defective hydraulic hose.
6. Replace hydraulic cylinder.
7. Replace pump (see Maintenance section).
8. Replace brushes.
9. -Check V1 on cylinder and manifold.
-Check V5 on cylinder.
10. Replace high-speed valve or coil.
11. Tighten connection or filter.
12. Replace valve.
13. Replace valve.

DESCENT SPEED SLOW

POSSIBLE CAUSES

1. Flow control out of adjustment.
2. Friction in structural members.
3. Obstruction in hydraulic hose.
4. Defective down valve.

REPAIR PROCEDURE

1. Adjust (see Maintenance section).
2. -Check for damaged members and cracked welds (see Maintenance section).
-Replace damaged structural members.
This is be done by factory authorized personnel only.
3. Replace defective hose.
4. Replace valve.

UNIT WILL NOT DESCENT

POSSIBLE CAUSES

1. Down signal not applied to down solenoid.
2. Defective down coil.
3. Defective down valve.

REPAIR PROCEDURE

1. -Check fuse.
-Check battery charge.
-Check electrical circuitry. Refer to electrical schematic.
2. Replace coil.
3. Replace valve.

UNIT CREEPS DOWN

POSSIBLE CAUSES

1. Damaged seal in lift cylinder.
2. Defective down valve.
3. Defective manual emergency down valve.

REPAIR PROCEDURE

1. Replace hydraulic cylinder (see Maintenance section).
2. Replace valve.
3. Replace valve.

DRIVE FUNCTION INOPERATIVE (motor not operating)

POSSIBLE CAUSES

1. Defective FORWARD/REVERSE switch.
2. Defective electrical circuitry.
3. Defective motor contactor.

REPAIR PROCEDURE

1. Check continuity. Replace switch.
2. Refer to electrical schematic.
3. Replace contactor.

DRIVE FUNCTION INOPERATIVE IN EITHER DIRECTION (motor not operating)

POSSIBLE CAUSES

1. Defective FORWARD/REVERSE switch.
2. Defective drive PMC or coil.
3. Defective electrical circuitry.
4. Low battery.
5. Defective motor.

REPAIR PROCEDURE

1. Replace switch.
2. Replace drive PMC or coil.
3. Refer to electrical schematic.
4. Charge battery.
5. Replace drive motor.

NO MOTION IN ONE DRIVE DIRECTION ONLY.

POSSIBLE CAUSES

1. Defective FORWARD/REVERSE valve or solenoid faulty.
2. Defective electrical circuitry.

REPAIR PROCEDURE

1. Replace defective valve or solenoid.
2. Refer to electrical schematic.

HYDRAULIC SYSTEM

Hydraulic System Bleeding

The hydraulic system is self-bleeding. After the system has been drained, such as during the replacement of a hydraulic system component, actuate the platform full up and down for six cycles and recheck the reservoir fluid level between each cycle. Fill as required.

Oil Filter Replacement

The oil filter in the hydraulic system should be changed yearly. Replace with filter part #4874007 only (Figure 19).

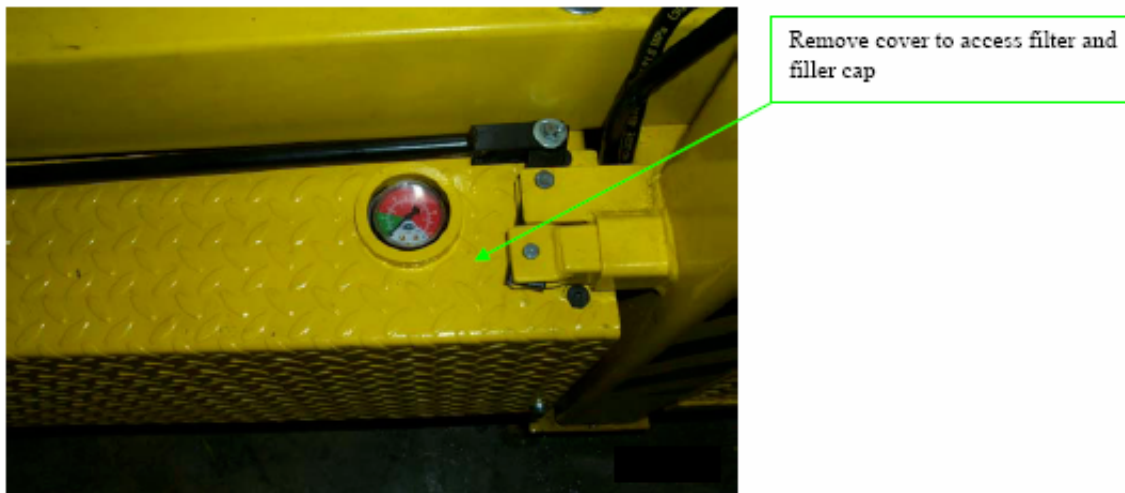


Figure 19. Filter and Filler cap location

Check and fill Hydraulic Reservoir

- 1- Lower platform completely.
- 2- Remove load from platform.
- 3- Raise platform high enough to engage maintenance lock (see maintenance lock).



WARNING

MAINTENANCE LOCKS MUST BE INSTALLED when maintaining or servicing machine with platform fully or partially extended. Working through beams on scissors lifting device creates a hazardous situation which could cause death or personal injury. **FOLLOW MAINTENANCE LOCKS PROCEDURE ON PAGE 3 OF THIS MANUAL.**

- 4- Lower platform so that maintenance lock rest on pivot pin.
- 5- Remove cover then filler cap and check fluid in reservoir.
- 6- Fill to proper level. Replace cap. Replace cover.
- 7- Raise platform slightly and retract maintenance lock.

Hydraulic pump and motor Replacement

- 1- Disconnect positive and negative battery cable by pulling battery disconnect handle out.
- 2- Tag and remove wires from hydraulic pump end motor assembly.
- 3- Remove hydraulic hoses from pump.

In the following step, the high pressure hydraulic line may still be under pressure and fluid will squirt out when line is disconnected. Do not reuse fluid, as it may become contaminated.



Figure 20. Hydraulic system

- A : Pump inlet quick valve (do not close while pump is operating).
B : 24VDC Electric Motor and Gear Pump Assembly.
C : 24VDC STAB/UNSTAB valve
D : 24VDC UP or *UPFAST/UPSLOW* valve. *(2 speeds optional)
E : Pump inlet hose
F : Flow control (Down Speed)
G: Flow control (Up slow Speed, 2 speeds optional)
H: Relief valve (Set to 2000psi)

Hydraulic Pump Motor Servicing

Common maintenance on DC motors is brush replacement. It is recommended that brushes be checked and replaced if necessary, along with commutator inspection, approximately every six months. The time interval will greatly vary depending on how the machine is being used and the condition of the battery, it is to your advantage to keep the batteries fully charged and in top condition to eliminate service problems in general, and to extend the life of the motor and brushes. (See Battery Servicing).

Platform Speed Valve Adjustment

- 1- Unscrew setscrew then turn flow control valve (See item F & G, figure 20) knob 'til you desired speed is reached.
- 2- Tighten setscrew.

Hydraulic Lift Cylinder Replacement



WARNING

MAINTENANCE LOCK MUST BE INSTALLED when maintaining or servicing machine with platform fully or partially **extended**. Working through beams on scissors lifting device creates a hazardous situation which could cause death or personal injury. FOLLOW MAINTENANCE LOCK PROCEDURE ON PAGE 3 OF THIS MANUAL.

- Raise platform.
- Engage maintenance lock (See Maintenance lock).
- Lower platform until beam assemblies touch maintenance lock.
- Wrap a self-tightening strap around center of the cylinder.
- With a lifting device apply upward pressure.
- Remove high-pressure hose from lower end of cylinder.
- Remove cylinder pin retainer plates on both sides of cylinder mounting (top & bottom).
- Remove top cylinder pin and bottom cylinder pin.
- Raise cylinder up and out of machine.
- Replace cylinder and reassemble in reverse order.
- Bleed air from system by raising and lowering platform 6 times.
- Recheck fluid level in down position.

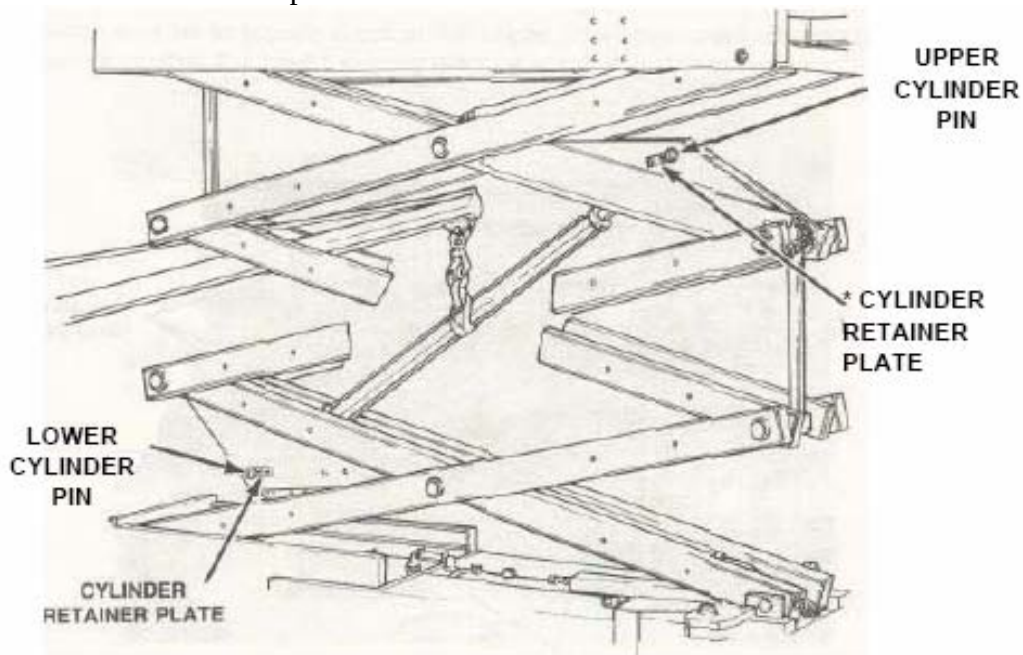


Figure 21. Removing Lift Cylinder, Pins and Retainers.

Outer Beams and Inner Beam Assembly Replacement

When replacing damaged or worn scissor lift beams, care must be taken to assemble beams so that outer beam washer reinforcements face toward inner beam assemblies.

CURTIS PMC MOTOR CONTROLLER

MANUAL

CURTIS*PMC*

1204X/1205X

and 1209/1221

MOTOR CONTROLLERS

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DESIGN OF CURTIS PMC 1200 SERIES
CONTROLLERS PROTECTED BY U.S.
PATENT NO. 4626750.

CURTIS

CURTIS PMC

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1204X / 1205X / 1209 / 1221 Manual
p/n 98796, Rev. D: May 1999

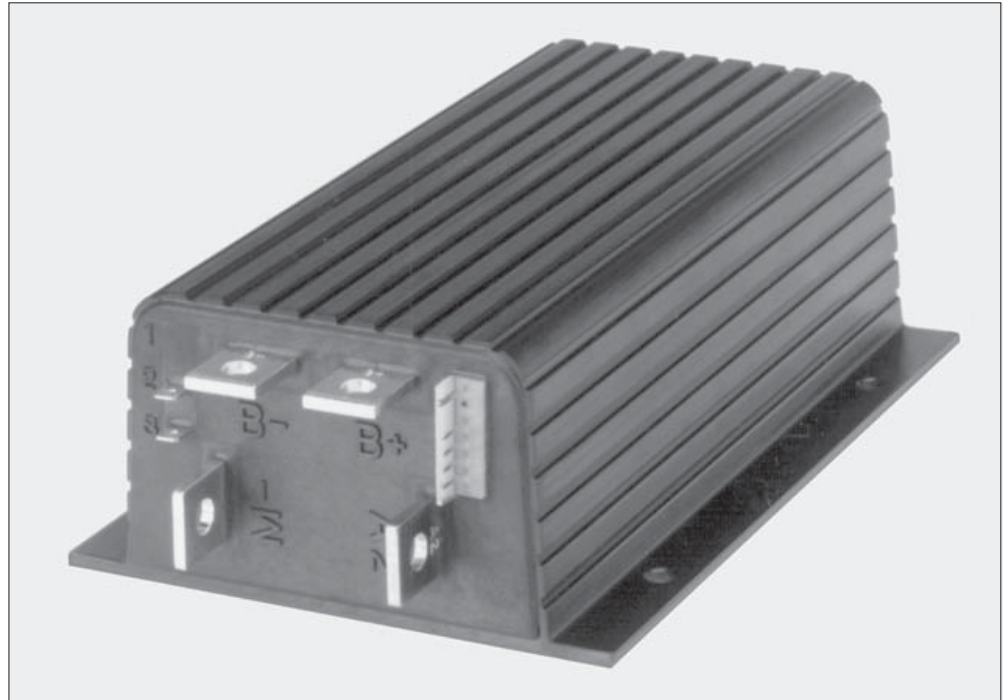
1

OVERVIEW

Curtis PMC Model 1204X/1205X and 1209/1221 electronic motor speed controllers are designed to provide smooth, silent, cost-effective control of motor speed and torque on a wide variety of industrial electric vehicles.

Fig. 1 *Curtis PMC 1205X full-feature electronic motor controller.*

Models 1204X, 1209, and 1221 have identical connections.



Like all Curtis PMC 1200 series controllers, the 1204X/1205X and 1209/1221 models offer superior operator control of the vehicle's motor drive speed. Key features of these controllers include:

- ✓ Infinitely variable drive and brake control
- ✓ Power MOSFET design provides high efficiency (for reduced motor and battery losses) and silent operation
- ✓ High pedal disable (HPD) function monitors throttle status during turn-on and prevents operation until throttle has been returned to neutral *[optional feature]*
- ✓ Thermal protection and compensation circuit provides both under-temperature and overtemperature cutback, as well as steady current limit throughout the entire operating range
- ✓ Undervoltage cutback function protects against low battery voltage, including low voltage caused by external loads

More Features 

- ✓ Fault detection circuitry monitors battery, throttle connections, output transistors, bypass contactor, etc., to prevent runaway conditions
- ✓ Static return to off (SRO) function requires that forward or reverse selectors be returned to neutral before output is allowed *[optional feature]*
- ✓ Emergency reverse enhances plugging current when “belly-button” is activated on walkie-type applications *[optional feature]*
- ✓ Delayed bypass (1A) output drives a bypass contactor *[optional feature]*
- ✓ Forward, reverse, and bypass contactor driver outputs are internally protected against shorts in the contactor coils
- ✓ Simple installation with no adjustments required
- ✓ Tin-plated solid copper bus bars
- ✓ Push-on connectors for control wiring

Familiarity with your Curtis PMC controller will help you to install and operate it properly. We encourage you to read this manual carefully. If you have questions, please contact the Curtis office nearest you.

CAUTION

Working on electric vehicles is potentially dangerous. You should protect yourself against runaways, high current arcs, and outgassing from lead acid batteries:

RUNAWAYS — Some fault conditions could cause the vehicle to run out of control. Jack up the vehicle and get the drive wheels off the ground before attempting these procedures or any other work on the motor control circuitry.

HIGH CURRENT ARCS — Electric vehicle batteries can supply very high power, and arcs can occur if they are short circuited. Always open the battery circuit before working on the motor control circuit. Wear safety glasses, and use properly insulated tools to prevent shorts.

LEAD ACID BATTERIES — Charging or discharging generates hydrogen gas, which can build up in and around the batteries. Follow the battery manufacturer’s safety recommendations. Wear safety glasses.

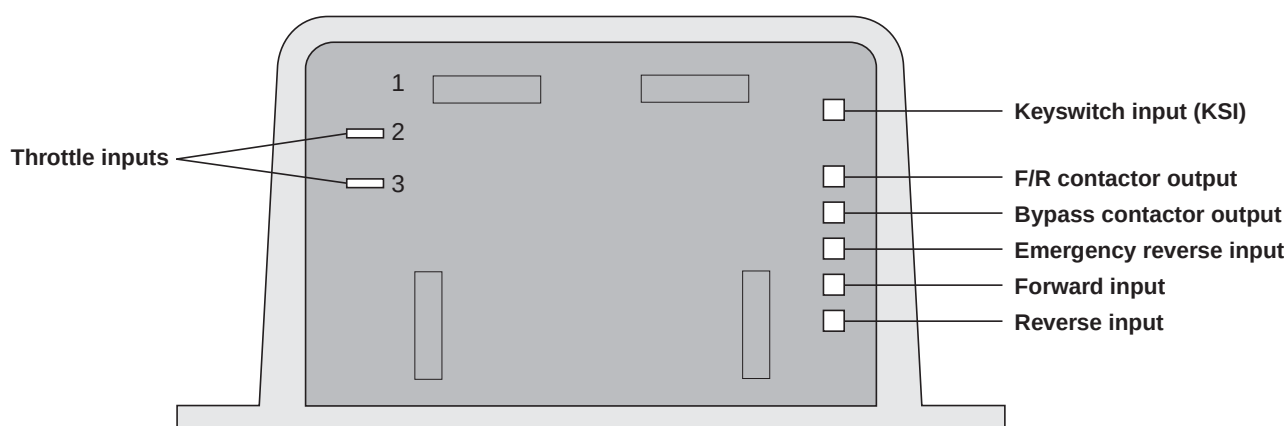
3

WIRING

CONNECTIONS: Low Current

Two 1/4" push-on terminals are provided for the throttle inputs. If your controller has a voltage throttle input, there will be only one throttle terminal.

A 6-pin low power connector molded into the right side of the controller face provides the low power logic control connections—KSI input, forward/reverse contactor output, bypass contactor output (*optional*), emergency reverse (*optional*), and forward and reverse inputs.

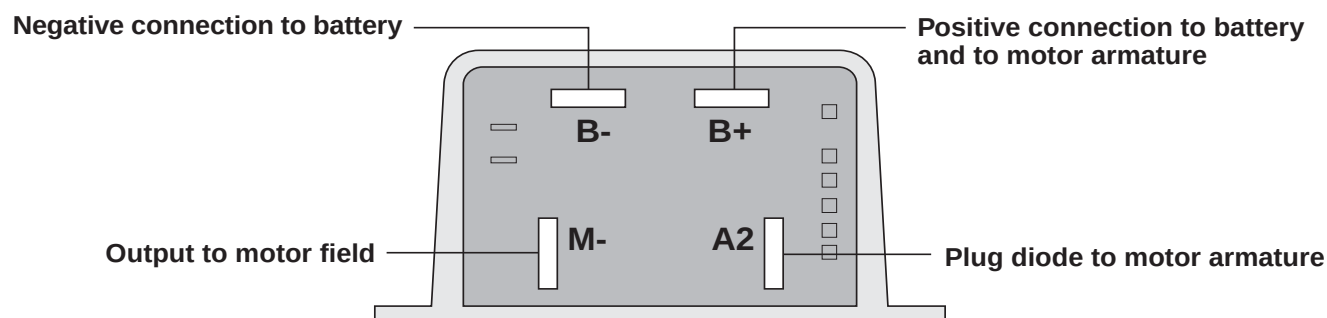


Several manufacturers make mating connectors that fit this connector. The part numbers listed are for the recommended 0.75 mm² (#18 AWG) vinyl insulated stranded wire.

MFR	PART NUMBER	DESCRIPTION
AMP	#640426-7	locking, insulation displacement terminals, wires at right angle to connector
Methode	#3300-107-218	locking, insulation displacement terminals
Molex	#09-50-3071	locking, crimp terminals
Panduit	#CE156F18-7	locking, insulation displacement terminals, wires at right angle to connector

CONNECTIONS: High Current

Four tin-plated solid copper bus bars are provided for the high current connections to the battery and motor.



The cables used for the battery and motor connections must be heavy enough to carry the high current required. Rubber insulated welding cable is convenient to work with because of its flexibility.

Connections to the controller bus bars should be made with lugs suitable for the cable used, fastened by M8 (5/16") bolts and nuts. **When tightening the bolts, two opposing wrenches should be used.** Failure to use the double-wrench technique could cause undue strain to be placed on the internal connections, and could also result in cracked seals around the bus bars.

WIRING: TYPICAL INSTALLATION

Curtis PMC 1204X/1205X/1209/1221 controllers are designed to satisfy the requirements of material handling applications using series motors. Figure 8 is a schematic diagram of the installation shown in Figure 7. Wired this way, the vehicle will plug brake if the direction is changed with the vehicle moving and the throttle applied. Reversing is accomplished via a forward/reverse changeover contactor or two single-pole, double-throw (2×SPDT) contactors. Coil suppression diodes should be used on the main and forward/reverse contactors.

KSI Wiring

The keyswitch input (KSI) circuit includes inputs from the keyswitch and from the various interlocks. The controller KSI is used to turn the controller on and off. KSI is turned on by connecting it to battery B+. Any positive voltage greater than about 8 volts will turn on the controller, but usually the full vehicle battery voltage is used.

In its simplest form, KSI is operated by a keyswitch that turns the vehicle off and prevents unauthorized use. The keyswitch should also turn off the main

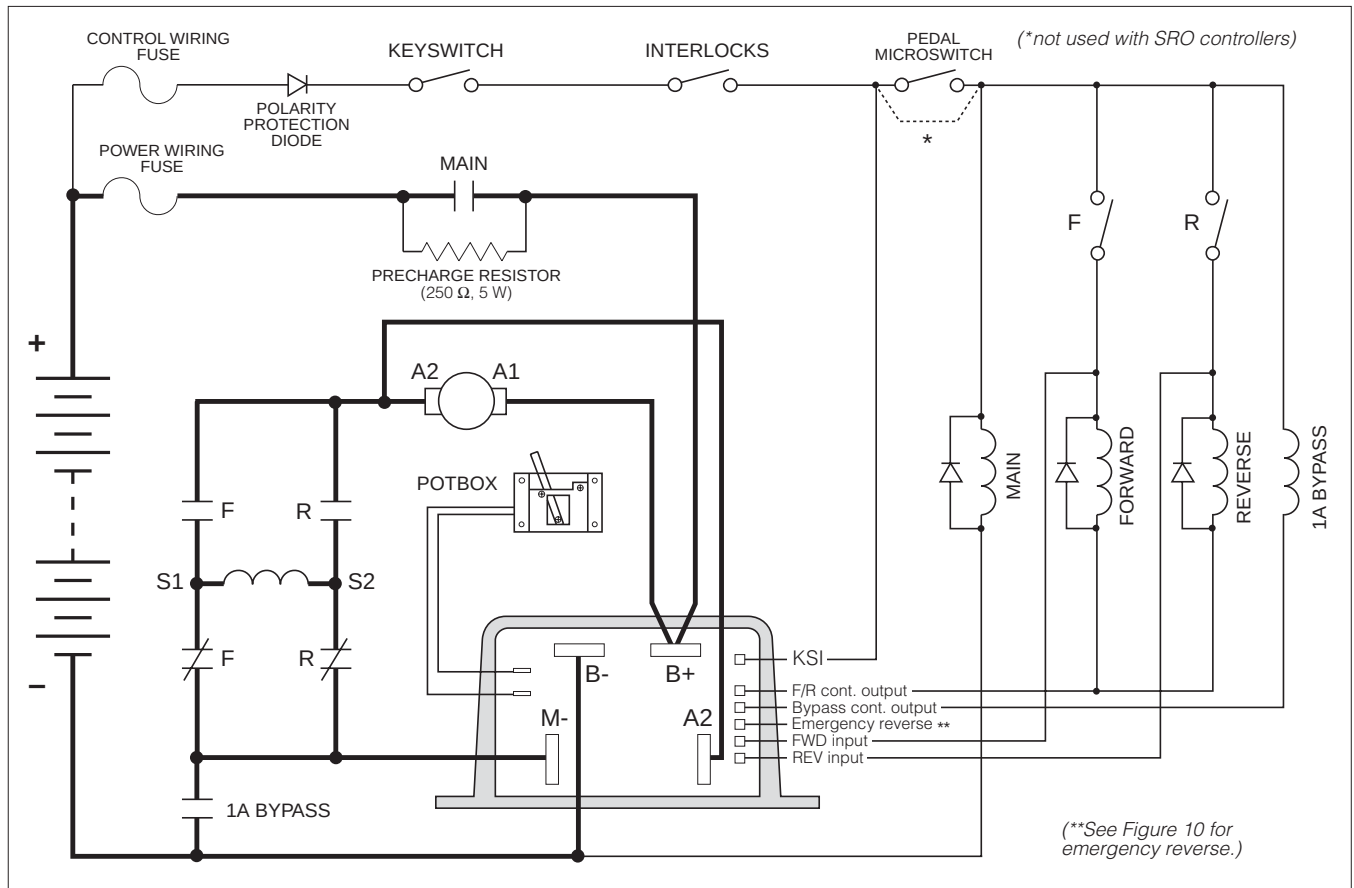


Fig. 8 Basic wiring configuration, Curtis PMC 1204X/1205X/1209/1221 controllers.

contactor and the forward/reverse contactors. This will act as a safety feature by removing power from the motor control system when the keyswitch is off.

Interlocks (seat switches, battery charger interlocks, etc.) should be wired in series so that they turn off the controller KSI and the contactors. An SRO interlock (a seat switch, for example) **must** be wired in order to implement the optional SRO feature.

Forward/Reverse Wiring

The forward/reverse wiring schemes described here all assume the power wiring shown by the heavy lines in Figure 8. Some vehicles, especially those previously using older, resistor-type controllers, may reverse the motor armature rather than the field winding. Be careful if you are replacing this type of controller. **When using the Curtis PMC controller it is essential that the field be reversed and that the armature be connected directly to the controller's B+ and A2 terminals, because the plug diode inside is connected to these terminals.**

4

MAINTENANCE & ADJUSTMENT

Curtis PMC 1204X/1205X/1209/1221 controllers and potboxes require only minimal maintenance if properly installed. NOTE: The controllers are sealed and thus are not field serviceable.

CONTROLLER

Maintenance



It is recommended that the following two steps be performed occasionally. **First remove power by disconnecting the battery, and discharge the capacitors in the controller** (with a light bulb or a 2–10 Ω , 25 W resistor connected for a few seconds across B+, B-). Follow good safety practices: get the vehicle drive wheels off the ground, wear safety glasses, and use insulated tools (*see page 2*).

1. Make sure the electrical connections to the controller (and to the motor, contactors, etc.) are tight. When checking the controller bus bar connections for tightness, use two opposing wrenches. This double-wrench technique will help avoid putting stress on the bus bars, which could crack the seals. **Always use insulated wrenches.**
2. Inspect all seals at the front and back of the controller. If necessary, use a moist rag to wipe these areas clean enough so that you can see the seals. Look for cracks and other signs of seal damage.

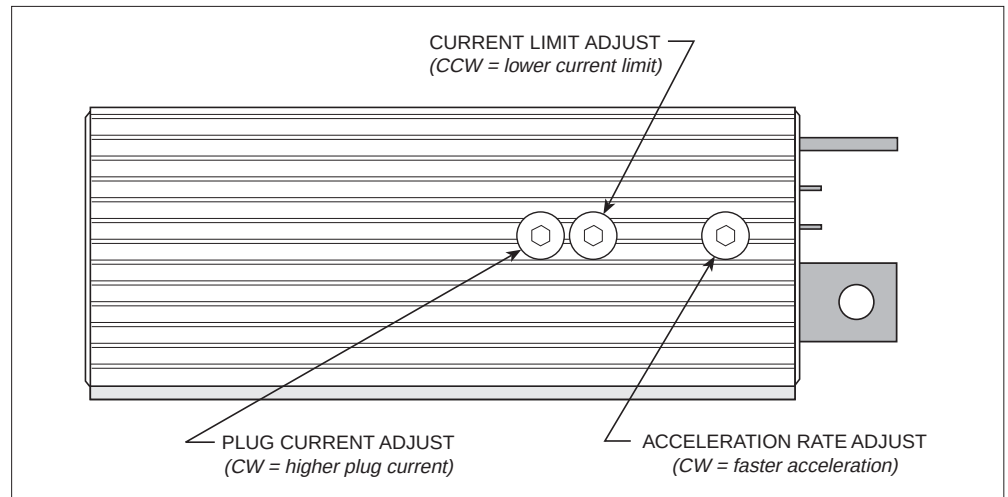
If the seals are intact, clean the controller thoroughly either by washing it off or by wiping it clean with a moist rag. **Power must not be reapplied until the controller terminal area is completely dry.**

If the seals have been damaged, there are several possible causes. Perhaps the double-wrench technique was not used when the cables were installed. Perhaps the vehicle's environment requires that the controller be better protected: either by mounting it in a different location, or by installing a protective cover.

Damaged seals can lead to faulty operation. We strongly recommend replacing controllers that have faulty seals.

Adjustment

Some controllers allow adjustment of the plug braking current, current limit, and acceleration rate settings. The adjustment pots on these models are located as shown in Figure 16.

Fig. 16 *Adjustment pots.*

Use the following adjustment procedure. **The keyswitch should be off during adjustment.**

1. Remove the socket head screw (1/8" Allen) for the adjustment you want to make.
2. Adjust the internal potentiometer using a small **insulated** screwdriver (*available from Curtis*).
3. Replace the socket head screw and nylon seal washer. To prevent stripping, do not over-tighten.

POTBOX

Maintenance

Potbox maintenance is similar to controller maintenance: inspect for integrity of connections and mounting, and clean (with a moist rag) as required.

Adjustment

Curtis PMC potboxes are factory set and rarely require user attention. To test and adjust, connect an ohmmeter to the potbox wires and use this procedure:

1. With the spring holding the lever arm against the return stop, the resistance should be less than 50 ohms. Slowly move the lever. If the resistance abruptly starts to increase when the lever is 3 mm (1/8") from the stop (1.5 mm [1/16"] for potboxes without the microswitch), no adjustment is needed.

2. If adjustment is required, loosen the screw holding the lever on the pot shaft. Use a screwdriver to rotate the pot shaft slightly with respect to the lever. Recheck the point at which the resistance starts to increase and continue making adjustments until the increase starts at 3 mm (1/8") [at 1.5 mm (1/16") for potboxes without the microswitch]. When adjustment is correct, tighten the screw holding the lever on the pot shaft, then recheck to see that this action did not disturb the adjustment. Make sure that the lever is still seated down on the pot shaft below the slight bevel on the end of the shaft.
3. Check the resistance with the lever pushed all the way to the other stop. It should be between 4500 and 5500 ohms. If it is outside this range, the potbox is faulty and should be replaced.
4. For potboxes equipped with a microswitch, check for correct switch operation. Use an ohmmeter, or simply listen for the slight click the switch makes. It should operate when the lever is 1.5 mm (1/16") from the return stop. If it does not, adjust by loosening the two screws holding the slotted microswitch mounting plate to the stop spacers and moving the plate. Recheck the switch operating point after tightening the screws.

SPARE PARTS

BODY



REF.	PART NO.	DESCRIPTION
1	2314320001	FRONT BUMPER
2	1005003	BUCKET SEAT ON SLIDE ADJUSTERS
	2803300009	LEFT HANDLE
	2803300008	RIGHT HANDLE
3	2223360001	WHEEL 18" O.D. LUG SOFT
4	2363487001	TOP
	CAB SECTION	CAB AND DOOR
5	2353320001	ROLL-OUT TRAY
	2662002	SPRING
	2354320001	LOCK PIN
6	2569487036	REAR LADDER
7	2555487008	RIGHT COVER
	2555487013	LEFT COVER
	2569487013	COVER WING
	2569487015	REAR MOTOR COVER
	2569487016	FRONT MOTOR COVER
	2569487018	COMPARTMENT HYDRAULIC COVER
8	2551487001	STABILIZER – FRAME
9	2551487008	STABILIZER – LEG
	2809487001*	INSULATOR (STABILIZER)
10	2553487001	PLATFORM
	2553487040*	PLATFORM (UPPER PART)
	2553487030*	PLATFORM (LOWER PART)
	3213-56*	INSULATOR (PLATFORM-DECK)
	2553487052	EXTENSION-DECK
	2569487006	ROLLER SUPPORT
	2569487060*	ROLLER SUPPORT, LEFT
	2569487061*	ROLLER SUPPORT, RIGHT
	2107000032	TRACK ROLLER
	2819487001	ANCHORAGE HOOK
11	2554487001	FRONT GUARD
	2554487006	RIGHT GUARD
	2554487031**	RIGHT GUARD
	2554487012	LEFT GUARD
	2554487030**	LEFT GUARD
	2554487013***	RIGHT GUARD, EXTENSION
	2554487021***	LEFT GUARD, EXTENSION
	2554487022	DOOR GUARD
	2569487067	DOOR LOCK
	2365000021	DOOR HINGE
12	2569487054	DASH SUPPORT
	2569487057	DASH PLATE
---	4800012	DECALS KIT

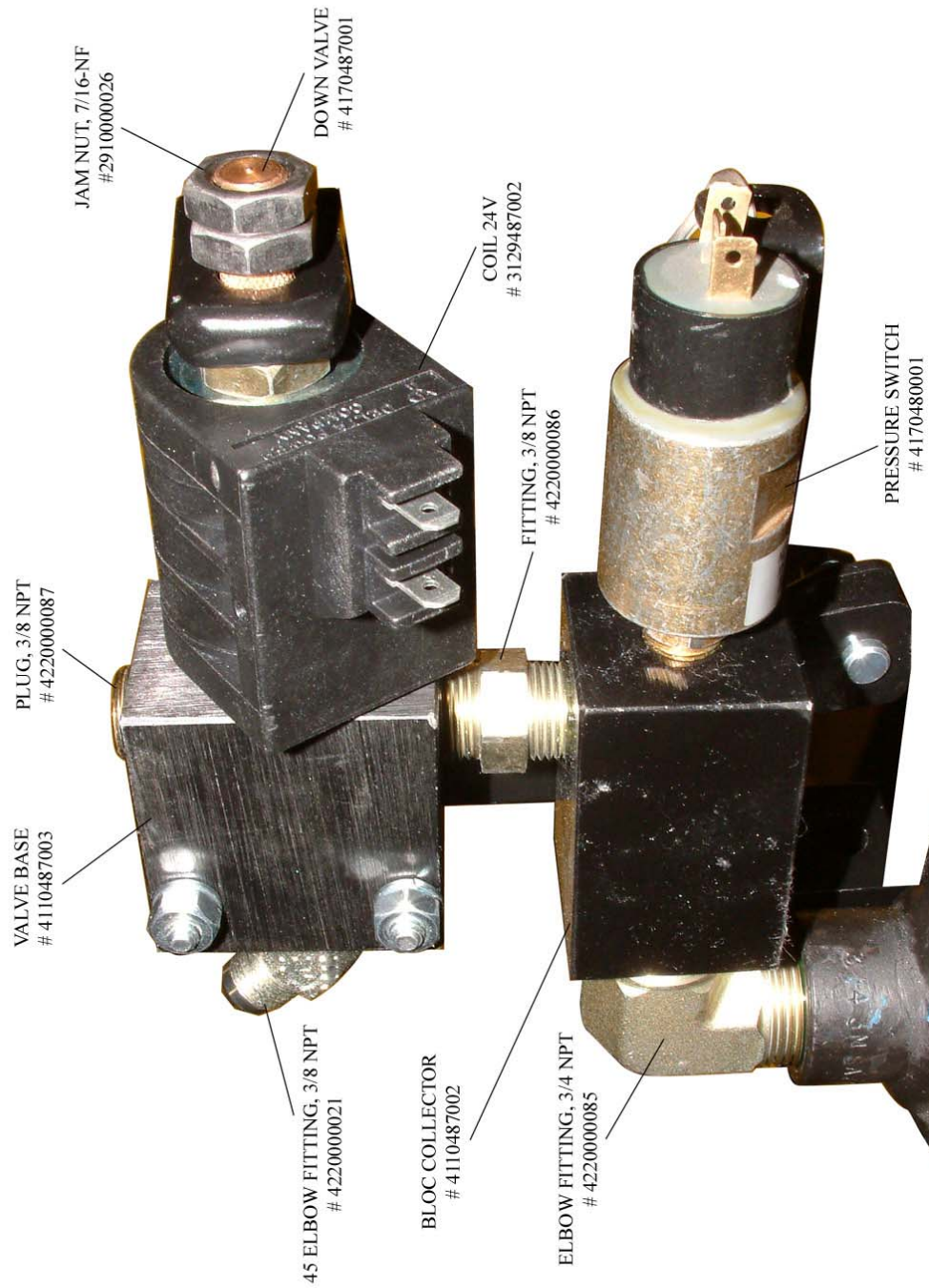
* INSULATED PLATFORM

** FLIP OUTSIDE OPTION

*** CHANGE SIDE WHEN FLIP OUTSIDE OPTION

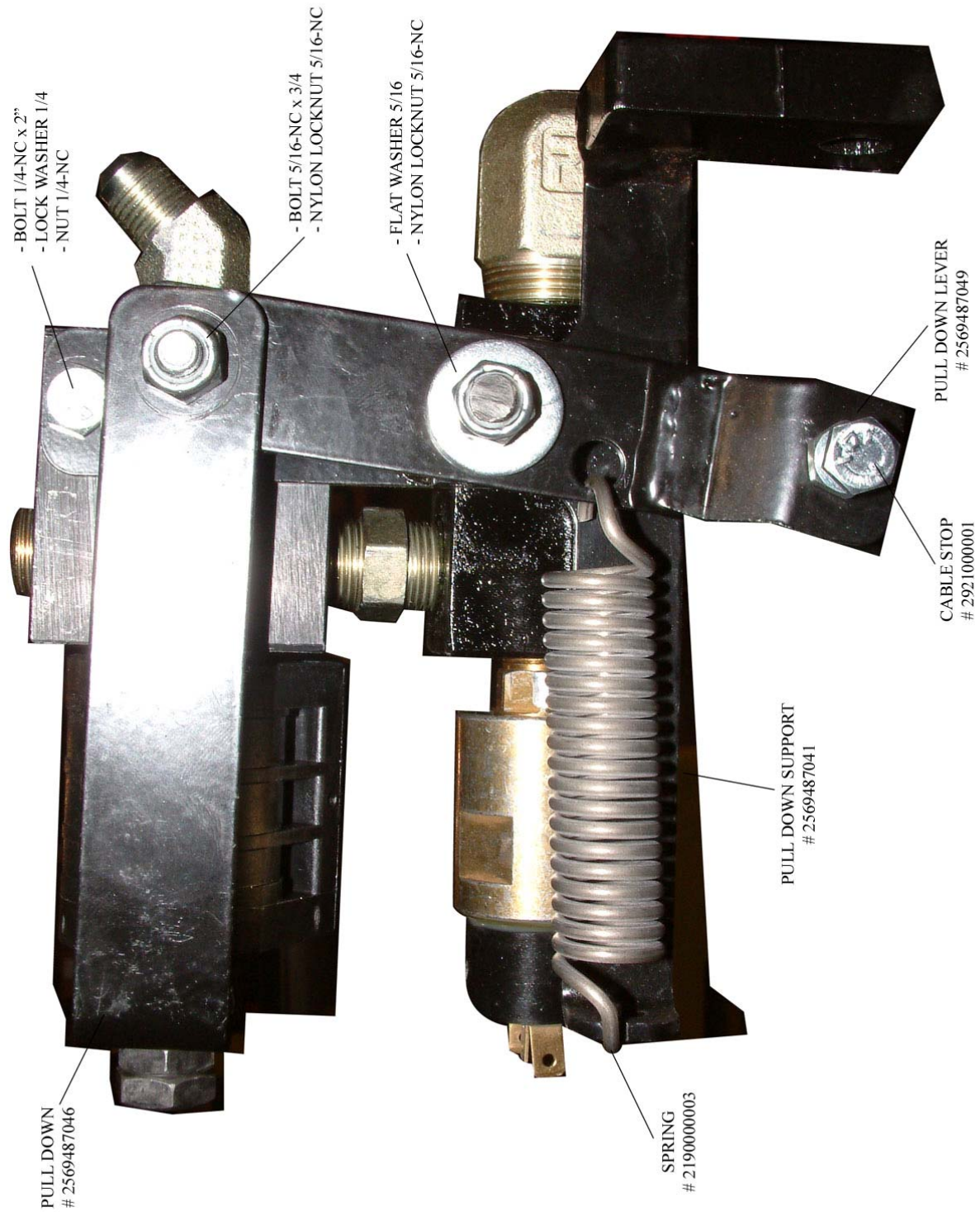
DOWN VALVE ASSEMBY

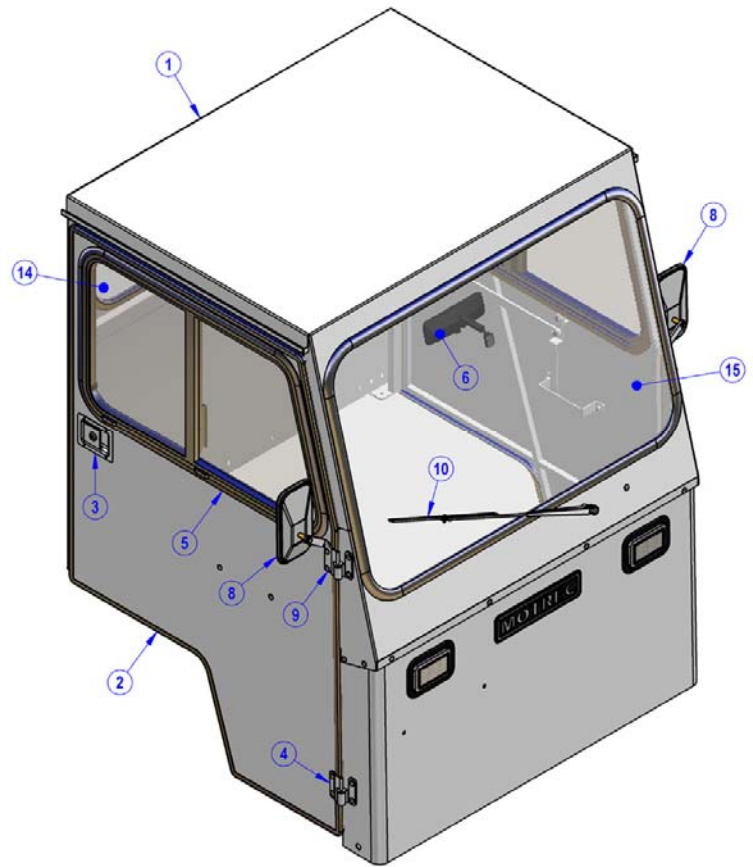
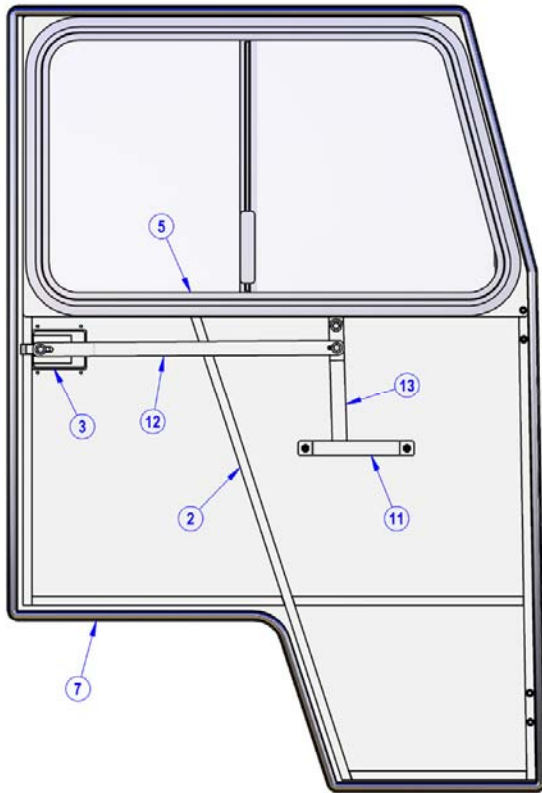
LEFT SIDE



DOWN VALVE ASSEMBLY

RIGHT SIDE



CAB**REF PART NO DESCRIPTION**

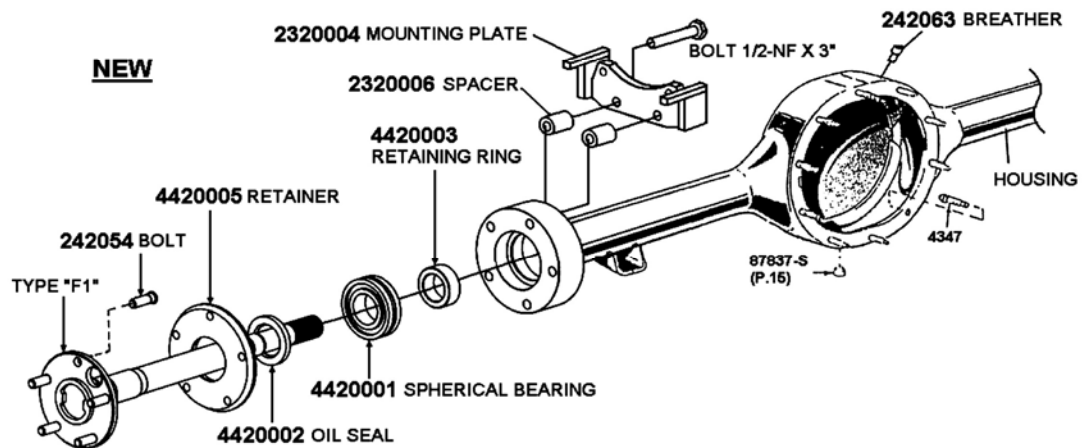
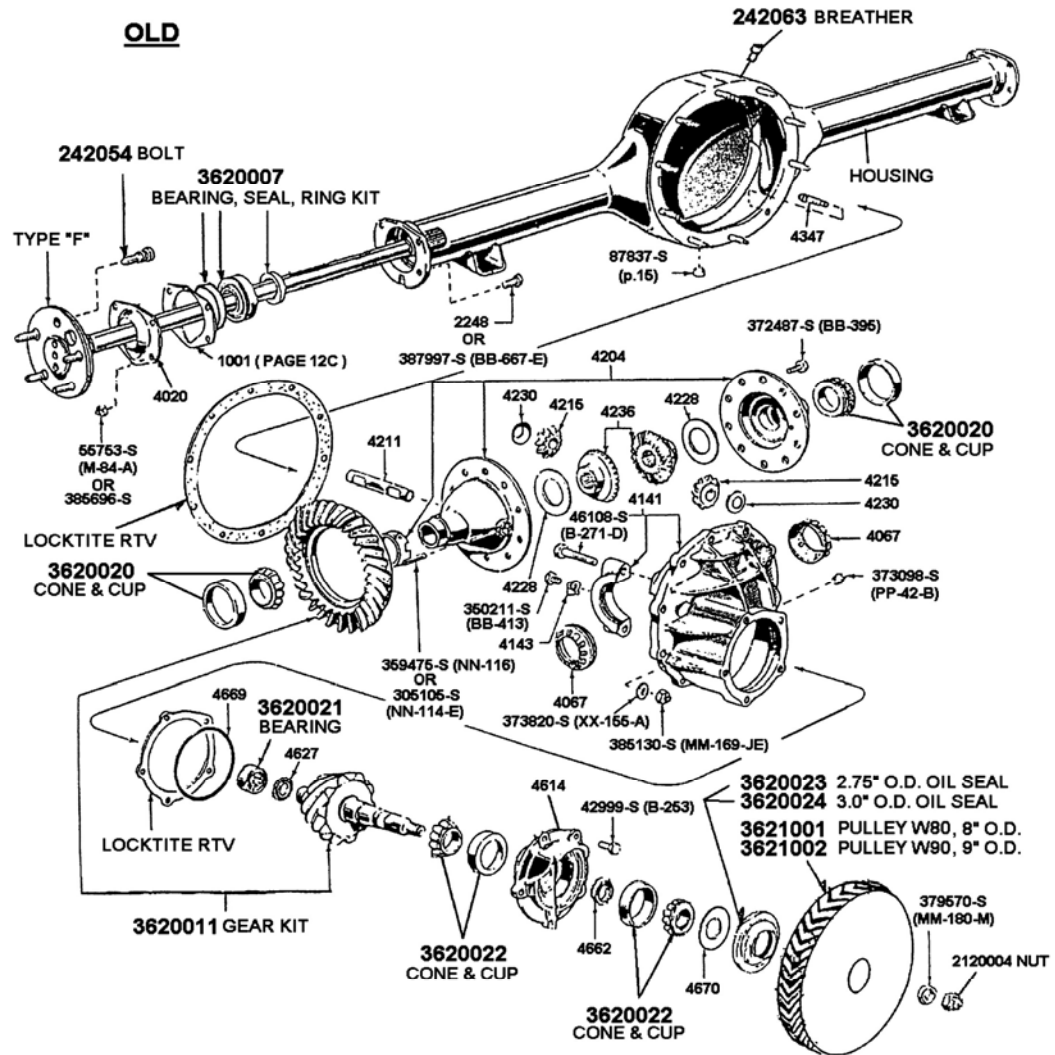
1	2360320012	STEEL CAB
	2382320009	SEATBACK CAB
2	2360320014	RIGHT DOOR
	2360320015	LEFT DOOR
	2360320024*	RIGHT DOOR, REAR PASSENGERS
3	2360320025*	LEFT DOOR, REAR PASSENGERS
	2803000003	PADDLE LATCH
4	2366320015	DOOR LATCH
	2365000001	RIGHT HINGES KIT
5	2365000002	LEFT HINGES KIT
	2367320002	RIGHT DOOR GLASS
	2367320001	LEFT DOOR GLASS
	2367320008*	RIGHT DOOR GLASS, REAR PASS.
	2367320007*	LEFT DOOR GLASS, REAR PASS.

REF PART NO DESCRIPTION

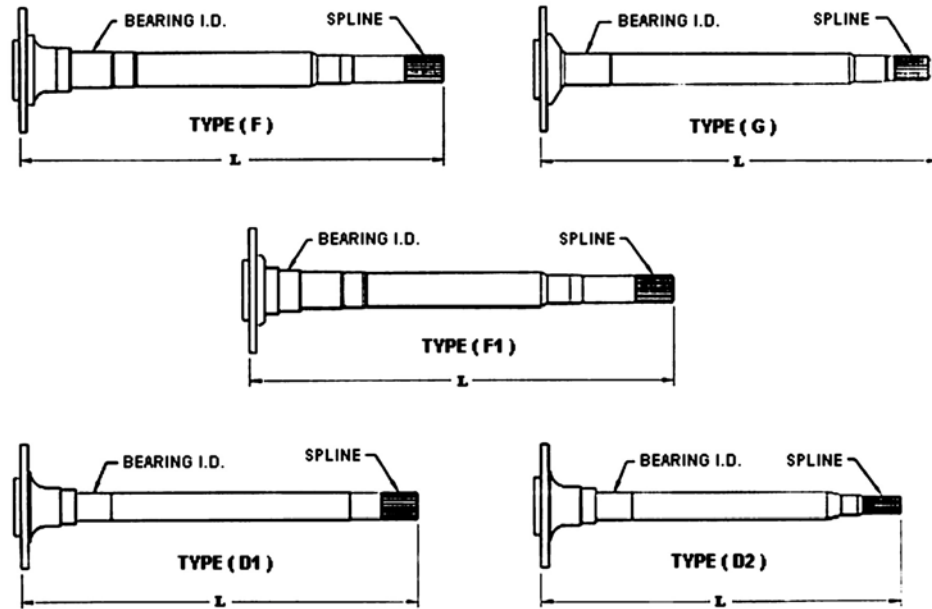
6	2801000002	REAR VIEW MIRROR
7	2802000001	TRIM DOOR
8	2801000001	SIDE MIRROR
9	2399000014	SIDE MIRROR BRACKET
10	3113000001	WIPER MOTOR
	2800000002	WIPER
	2800000001	ARM
11	2366320001	DOOR HANDLE
12	2366320002	DOOR HANDLE BAR
13	2366320003	DOOR LEVER
14	2367300001	REAR GLASS
15	2367300002	WINDSHIELD

* 4 or 6 passengers option

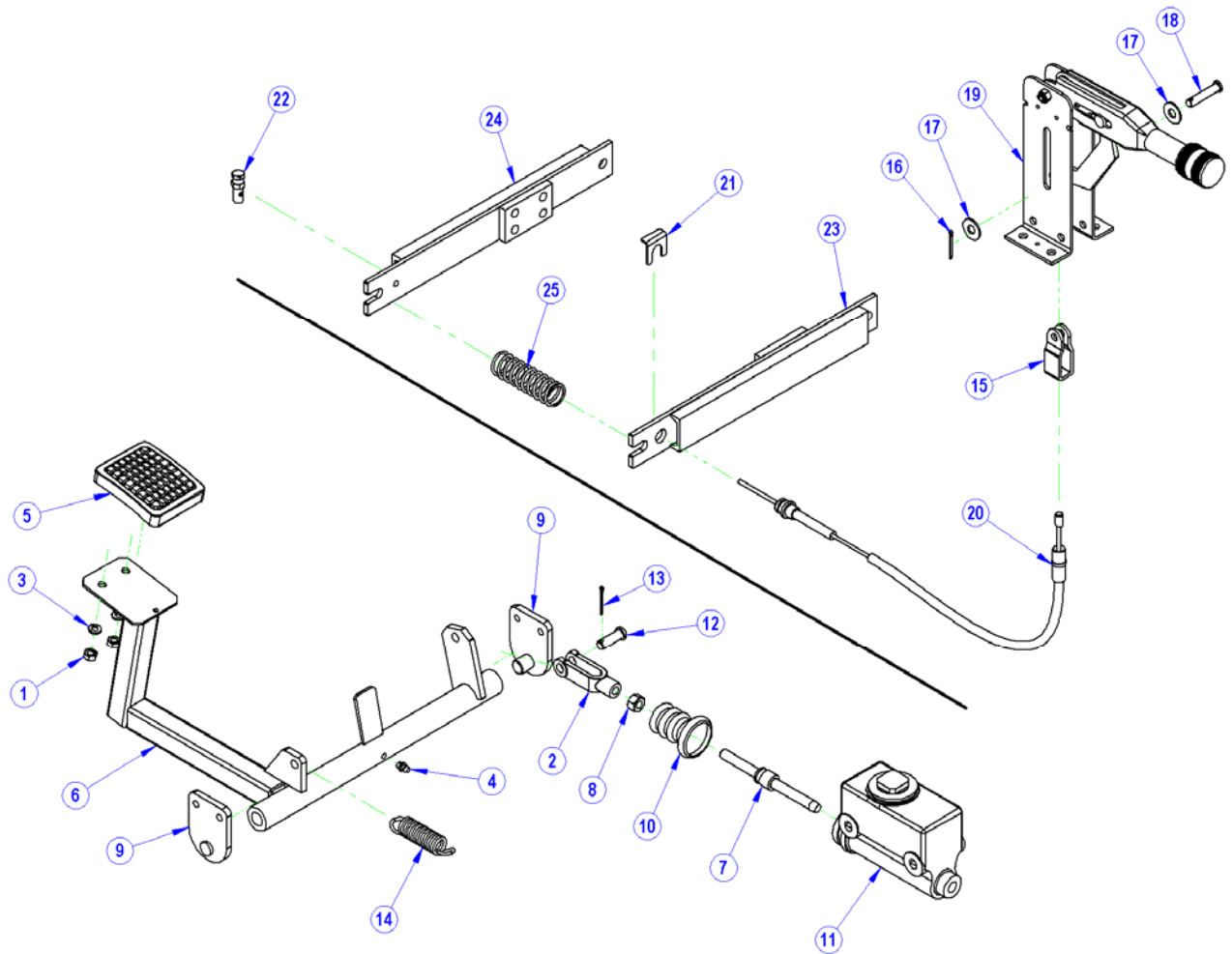
FORD F-150 DIFFERENTIAL



QTY.	PART NUMBER	DESCRIPTION	QTY.	PART NUMBER	DESCRIPTION
FORD WEC (NON-LOCKING) REAR AXLE SERVICE PARTS LIST NO. 237					
				4067	Shim (differential bearing adjustment) — Cont'd
			AR D9AZ	4067-AG	.299" thick
			AR D9AZ	4067-AH	.301" thick
			AR D9AZ	4067-AJ	.303" thick
			AR D9AZ	4067-AK	.305" thick
			AR D9AZ	4067-AL	.307" thick
				4200	Differential assy.—refer to group in Section 40
				4204	Case assy. (differential)
1	373098-S100 (PP-42-B)	Plug (housing)—1/2"—14	1	E7TZ 4204-E	Use with axle #720C,724S,730D-1987/
1	E3AZ 4033-A	Cover assy. (housing)—also serviced in assy.—group 4010			
	4036	Gasket (cover to housing)—use D8AZ 19562-B			
	4067	Shim (differential bearing adjustment)			
AR D9AZ	4067-A	.241" thick			
AR D9AZ	4067-B	.243" thick			
AR D9AZ	4067-C	.245" thick			
AR D9AZ	4067-D	.247" thick			
AR D9AZ	4067-E	.249" thick			
AR D9AZ	4067-F	.251" thick			
AR D9AZ	4067-G	.253" thick			
AR D9AZ	4067-H	.255" thick			
AR D9AZ	4067-J	.257" thick			
AR D9AZ	4067-K	.259" thick			
AR D9AZ	4067-L	.261" thick			
AR D9AZ	4067-M	.263" thick			
AR D9AZ	4067-N	.265" thick			
AR D9AZ	4067-P	.267" thick			
AR D9AZ	4067-R	.269" thick			
AR D9AZ	4067-S	.271" thick			
AR D9AZ	4067-T	.273" thick			
AR D9AZ	4067-U	.275" thick			
AR D9AZ	4067-V	.277" thick			
AR D9AZ	4067-W	.279" thick			
AR D9AZ	4067-X	.281" thick			
AR D9AZ	4067-Y	.283" thick			
AR D9AZ	4067-Z	.285" thick			
AR D9AZ	4067-AA	.287" thick			
AR D9AZ	4067-AB	.289" thick			
AR D9AZ	4067-AC	.291" thick			
AR D9AZ	4067-AD	.293" thick			
AR D9AZ	4067-AE	.295" thick			
AR D9AZ	4067-AF	.297" thick			
1	E7TZ 4236-A	Gear kit (differential side)—use with axle #720C,724S,730D-1987/ Consists of 2-E7TZ 4228-A Washer 2-E7TW 4236-AA Gear	1	C7AZ 4628-A	Cup (driving pinion bearing—rear)— #M802011
2	C7AZ 4N237-A	"U" washer (axle shaft retaining)	1	C7AZ 4630-A	Cone and roller (drive pinion rear bearing)— #M802048
1	D8BZ 4241-A	Pin (differential pinion shaft lock)	1	B7A 4662-A	Spacer (driving pinion bearing)— 1 5/16" I.D. x 15/32" long—collapsible— also serviced in kit—group 4209
2	C7AZ 4A332-A	"O" ring (axle shaft)		4663	Shim (pinion bearing)—serviced only in kit—group 4209
	4346	Bolt (housing cover)—self-locking— 5/16"—18 x 5/8"—also serviced in assy.—group 4010	1	D5AZ 4670-A	Slinger (pinion shaft oil)
10	E6TZ 4346-A	Use with axle #WEC-A,B,720C,724S,730D,760B, 762T	1	E5DZ 4676-A	Seal assy. (drive pinion oil)— #E5DW 4676-AA
8	E6TZ 4346-A	Use with axle #780C,762P		4851	Flange assy. (universal joint)—axle end 1330 size—1987/
2	E5TZ 4346-A	Stud (housing cover)—5/16"—18 and— 5/16"—18 x 1 1/2" long—also serviced in assy.—group 4010—use with axle #760C,762P	1	389546-S100 (MM-170-A)	Locknut and washer assy. (flange to pinion)— 3/4"—20—also serviced in kit—group 4209
1	B7A 4616-A	Cup (driving pinion bearing front)—#88048		4859	Deflector (driving pinion oil seal)
1	B7A 4621-A	Cone and roller (drive pinion front bearing)— #M88048	1	E6TZ 4859-A	Plastic—"From 1/86"—1986/

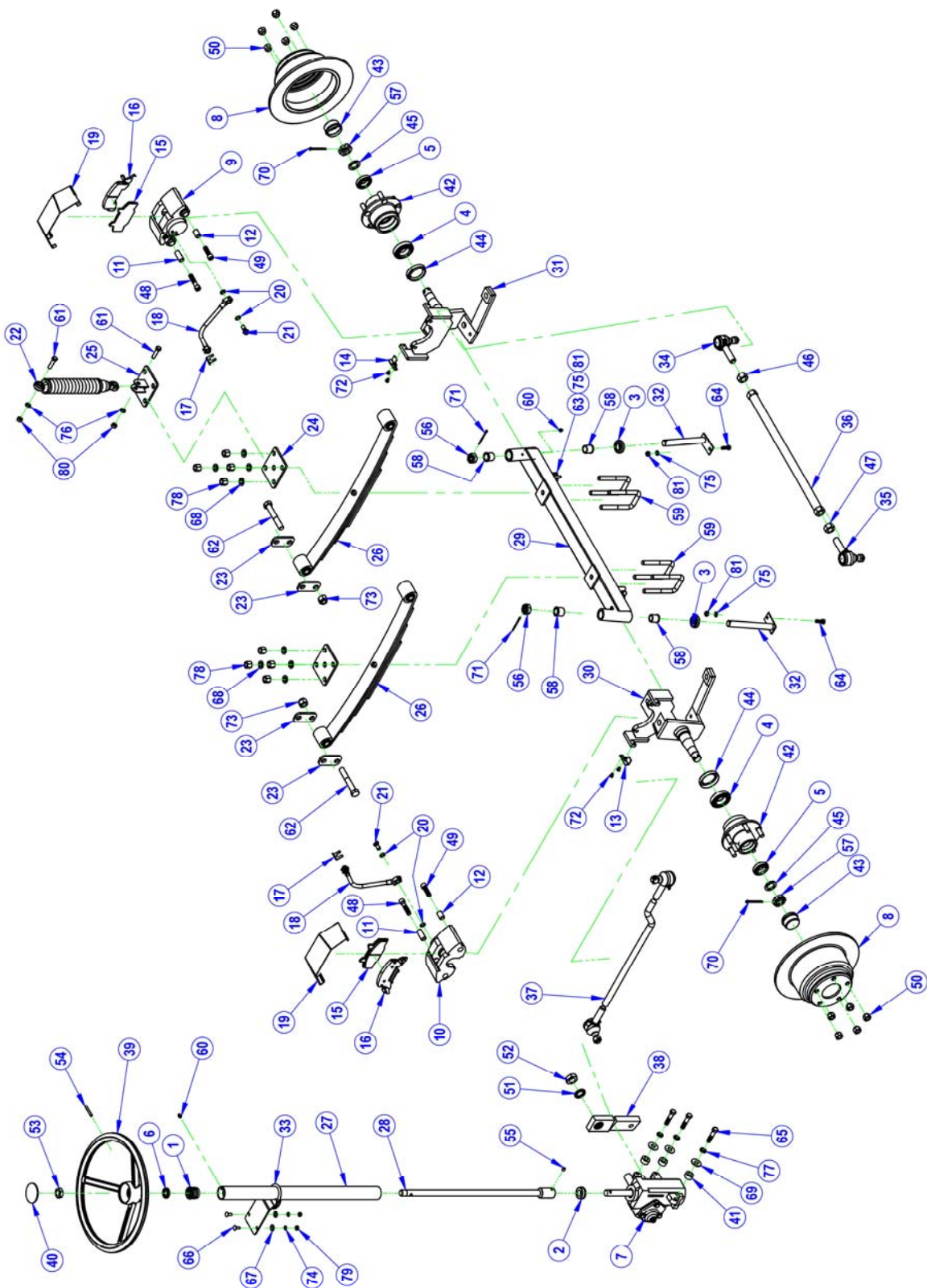


TYPE	LENGHT (In)	BOLT	BEARING I.D. (In)	SPLINE	NUMBER
F	12.6	5	1.565	28	2135000
F	12.6	5	1.565	31	2135001
F	14.84	5	1.374	28	4435001
F	14.84	5	1.374	31	4435002
F	16.1875	5	1.565	28	3620009
F	16.1875	5	1.565	31	3620014
F	18.375	5	1.565	28	3620013
F	18.375	5	1.565	31	3620015
F1	12.6	5	1.774	31	2135002
F1	12.6	5	1.774	28	2135003
F1	19.375	5	1.774	31	4435003
F1	18.375	5	1.774	31	4435004
F1	18.375	5	1.774	28	4435005
F1	14.88	5	1.774	31	4435006
F1	14.88	5	1.774	28	4435007
F1	23.375	5	1.774	28	4835006
F1	23.375	5	1.774	31	4835007
F1	16.88	4	1.374	26	2635002
F1	23.88	4	1.374	26	2635001
GM	16.88	5	1.774	31	2835001
GM	21	5	1.774	31	6635001
GM	11.125	4	1.395	26	242052
GM	14.125	4	1.395	26	282052
GM	16.875	4	1.395	26	382052
GM	11.125	4	1.374	26	2420014
GM	14.125	4	1.374	26	2820004
GM	12.6	5	1.374	26	2820013
GM	14.87	5	1.374	26	2235007
GM	17.12	4	1.374	26	3020004
GM	17.12	5	1.374	26	3620005
GM	25.12	5	1.374	26	4835002
GM	19.62	5	1.374	26	4835005
D1	14.75	5	1.188	27	282002
D1	17.125	5	1.188	27	302002
D2	15.625	5	1.188	24	012SR124-1
D2	18.875	5	1.188	24	012SR124-2
D2	17.375	5	1.188	24	012SR130-3
D2	18.625	5	1.188	24	012SR130-1

BRAKE CONTROLS

REF	PART NO	DESCRIPTION	QTY	REF	PART NO	DESCRIPTION	QTY
1		Nut 1/4-20UNC	1	14	2190000003	Spring (Extention)	1
2	2910000015	Yoke	1	15	2910000013	Yoke	1
3		Lock washer ¼	1	16		Cotter pin 3/32 x 1	1
4	2930000012	Lubrication fitting	1	17		Flat washer 5/16	2
5	2131100002	Rubber pad	1	18		Clevis pin 5/16 x 1-1/2	1
6	2131360002	Lever	1	19	2139240002	Handbrake lever	1
6	2131360012	Lever	1	20	2129000003	Handbrake cable	1
7	2133280001	Push rod-Master cylinder	1	21	2129000001	Clip	1
8		Nut 3/8-16UNF	1	22	2921000001	Cable stop	1
9	2132320001	Pivot	2	23	2127000006	Handbrake band (side cable)	1
10		Boot, included with #2125000001	1	24	2127000001	Handbrake band	1
11	2125000001	Master cylinder	1	25	2191240002	Spring (compression)	1
12		Clevis pin 3/8 x 1-3/32	1				
13		Cotter pin 3/32 x 1	1				

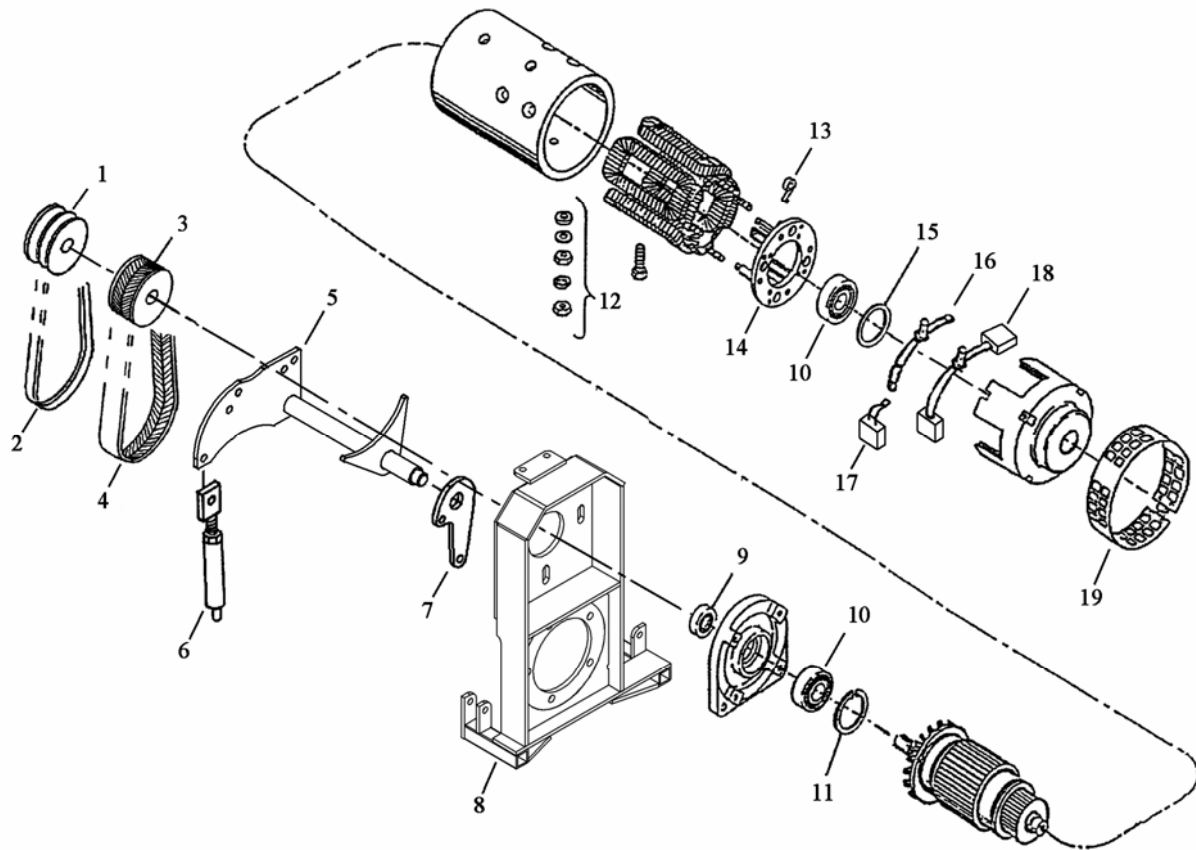
* EE version



REF	PART NO	DESCRIPTION	REF	PART NO	DESCRIPTION
1	2100300002	BUSHING	41	2219250001	SPACER
	2100300001	BUSHING WITH OIL SEAL	42	2224300002	HUB
2	2100300003	BUSHING	43	2229300001	DUST CAP
3	2103250001	THRUST BEARING	44	2229300002	OIL SEAL
4	2103300001	TAPER BEARING	45	2229300003	SPINDLE WASHER
5	2103300002	TAPER BEARING	46	2910000005	NUT, LEFT HAND
6	2104300004	OIL SEAL	47	2910000006	NUT, RIGHT HAND
7	2117250001	GEAR	48	2910000017*	BOLT, LONG
8	2120236001*	DISC	49	2910000018*	BOLT, SHORT
9	481431*	RIGHT CALIPER	50	2910000019	WHEEL NUT
10	481430*	LEFT CALIPER	51	2910000020	LOCK WASHER 7/8
11	2121000005*	BUSHING, LONG	52	2910000021	JAM NUT 7/8-NF
12	2121000006*	BUSHING, SHORT	53	2910000022	JAM NUT 3/4-NF
13	2122300001*	LEFT CALIPER SUPPORT	54	2910000023	SPRING PIN ¼ X 1 3/4
14	2122300002*	RIGHT CALIPER SUPPORT	55	2910000024	SET SCREW 5/16-NC
15	2128280001*	PADS	56	2910300001	CASTELLATED NUT 3/4-NF
16	2128280001*	PADS	57	2910300002	CASTELLATED NUT 1-UNEF
17	2129000001*	CLIP	58	2914364001	BUSHING
18	2134000001*	FLEX, HOXE	59	2916000001	U-BOLT
19	2139000001*	CALIPER PROTECTOR	60	2930000012	GREASE FITTING
20	2139000002*	WASHER	61**		BOLT 3/8-NC X 1 ½
21	2139000003*	BOLT	62		BOLT 5/8-NC X 4
22	2180240001**	SHOCK ABSORBER	63		BOLT 5/16-NC X 1 1/4
23	2182320001	SHACKLE LINK	64		BOLT 5/16-NC X 1
24	2185320001	PLATE	65		BOLT 7/16-NC X 2
25	2185488001**	PLATE	66		CARRIAGE BOLT 1/4-NC X 3/4
26	2192280001	LEAF SPRINGS	67		FLAT WASHER 1/4
27	2200300002	TUBE	68		FLAT WASHER 12mm
28	2200300003	SHAFT	69		FLAT WASHER 7/16
29	2201320001	AXLE BEAM	70		COTTER PIN 3/16 X 2
30	2201320008	LEFT SPINDLE	71		COTTER PIN 7/64 X 2
	2201360001*	LEFT SPINDLE, BRAKES	72*		MACHINE SCREW 1/4-NC X 3/8
31	2201320009	RIGHT SPINDLE	73		NYLON NUT 5/8-NC
	2201360002*	RIGHT SPINDLE, BRAKES	74		LOCK WASHER 1/4
32	2205250001	KING PIN	75		LOCK WASHER 5/16
33	2206300003	STEERING SUPPORT,	76**		LOCK WASHER 3/8
		BOLT PATTERN 2 3/8"	77		LOCK WASHER 7/16
	2206320001	STEERING SUPPORT,	78		HEAVY NUT 1/2-NF
		BOLT PATTERN 2 1/4"	79		NUT 1/4-NC
34	2207000001	ROD END, LEFT HAND	80**		NUT 3/8-NC
35	2207000002	ROD END, RIGHT HAND	81		NUT 5/16-NC
36	2207300006	REAR TIE ROD			
37	2207320001	FRONT TIE ROD			
38	2207320009	ARM			
39	2208240001	STEERING WHEEL			
40	2208240002	COVER			

* Front axle with hydraulic disc brakes

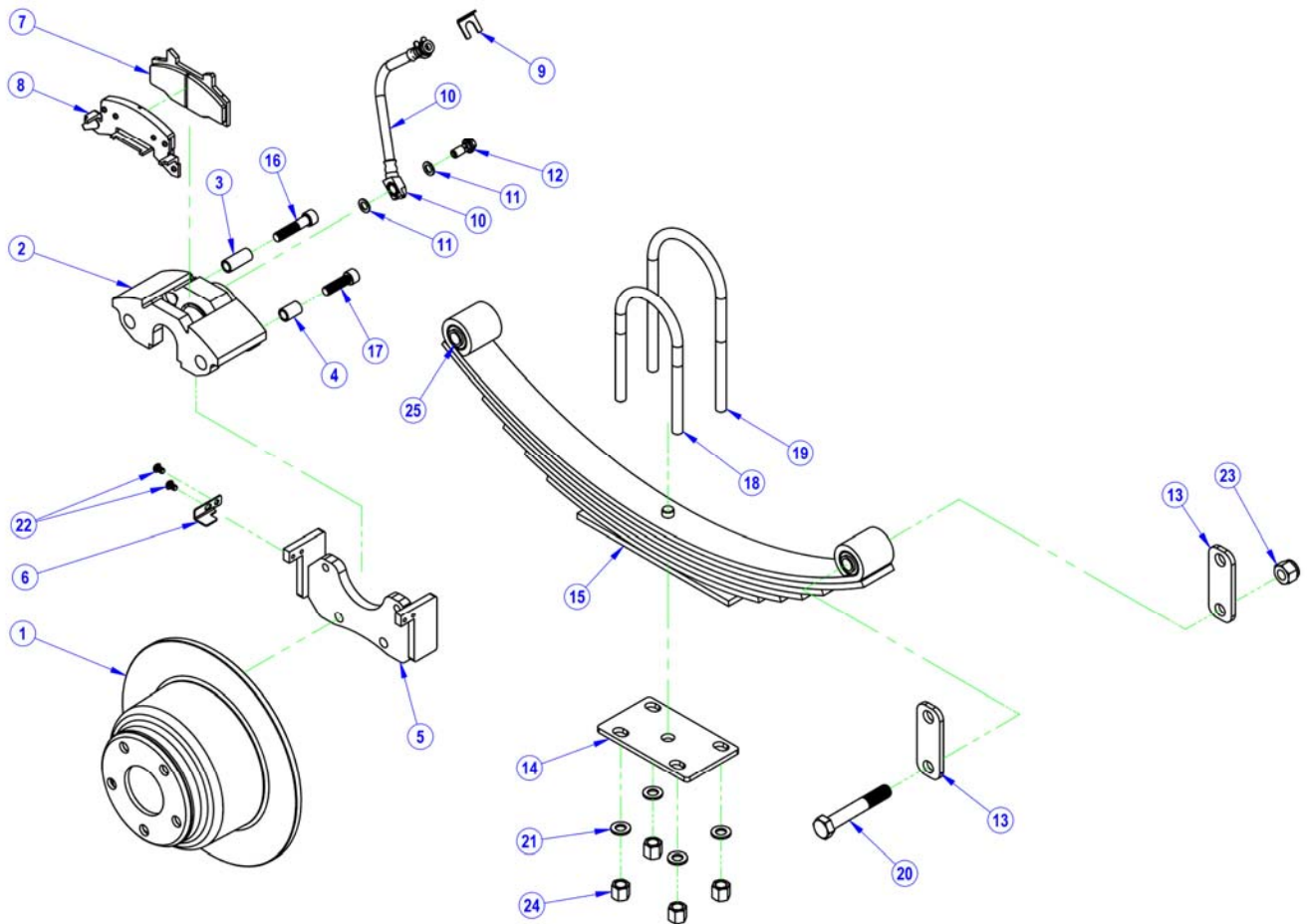
** Front axle with shock absorber

MOTOR AND DRIVE**COMMON PARTS**

REF	DESCRIPTION	PART #	REF	DESCRIPTION	PART #
1	PULLEY	262424	8	MOTOR BASE, FORD	Contact manuf.
2	V BELT	242431		BELT TENSIONER	2152002
3	PULLEY	3651001	9	SEAL	484001
4	BELT, EAGLE	3651002	10	BEARING	484003
5	MOTOR BASE, GM	Contact manuf.	11	SNAP RING	484004
6	BELT TENSIONER, LONG	2452005	12	NUT WASHER PACK	484006
7	BELT TENSIONER, SHORT	2452003	15	WAVY WASHER	484013
	PIVOT	2452002	19	HEADBAND	484015
				EE HEADBAND KIT	A91-107A

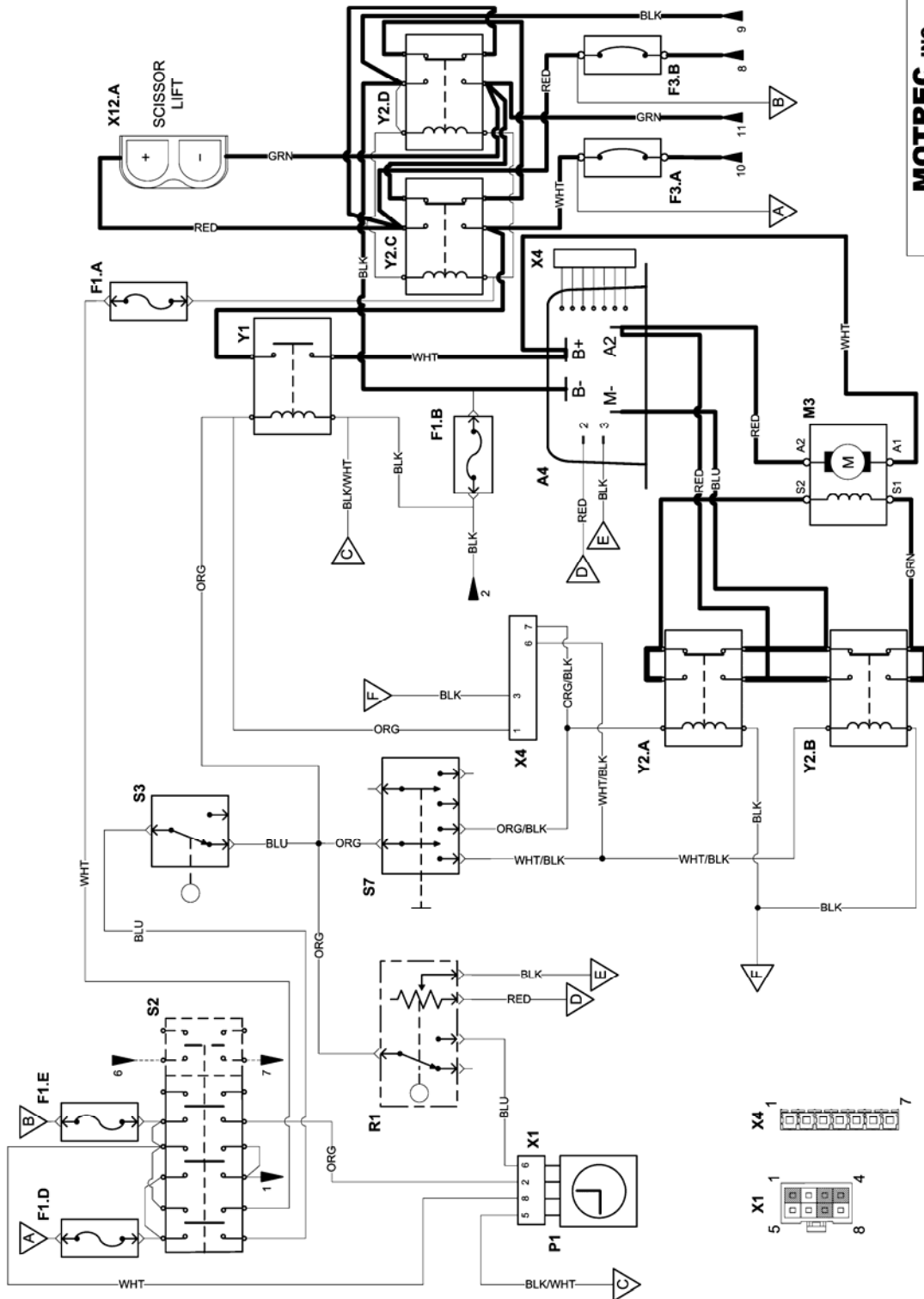
SPECIFIC

REF	DESCRIPTION	A89	B98	A00	D00 SEPEX	DC3 SEPEX	DANA DRIVE
	MOTOR ASS'Y	484000	204050	2950002	2450003	3112210001	3122230001
13	BRUSH SPRING	484010	484010	2450006	2450006	2450006	2450006
14	BRUSH PLATE	484011	484011	2450007	2450007	2450007	2450007
16	LEAD ASSY.	484017	484017	N/A	N/A	N/A	N/A
17	BRUSH	484009	484009	N/A	N/A	N/A	N/A
18	LEAD AND BRUSH ASSY.	N/A	N/A	2450008	2450008	3112210004	2450008

REAR SUSPENSION AND BRAKE

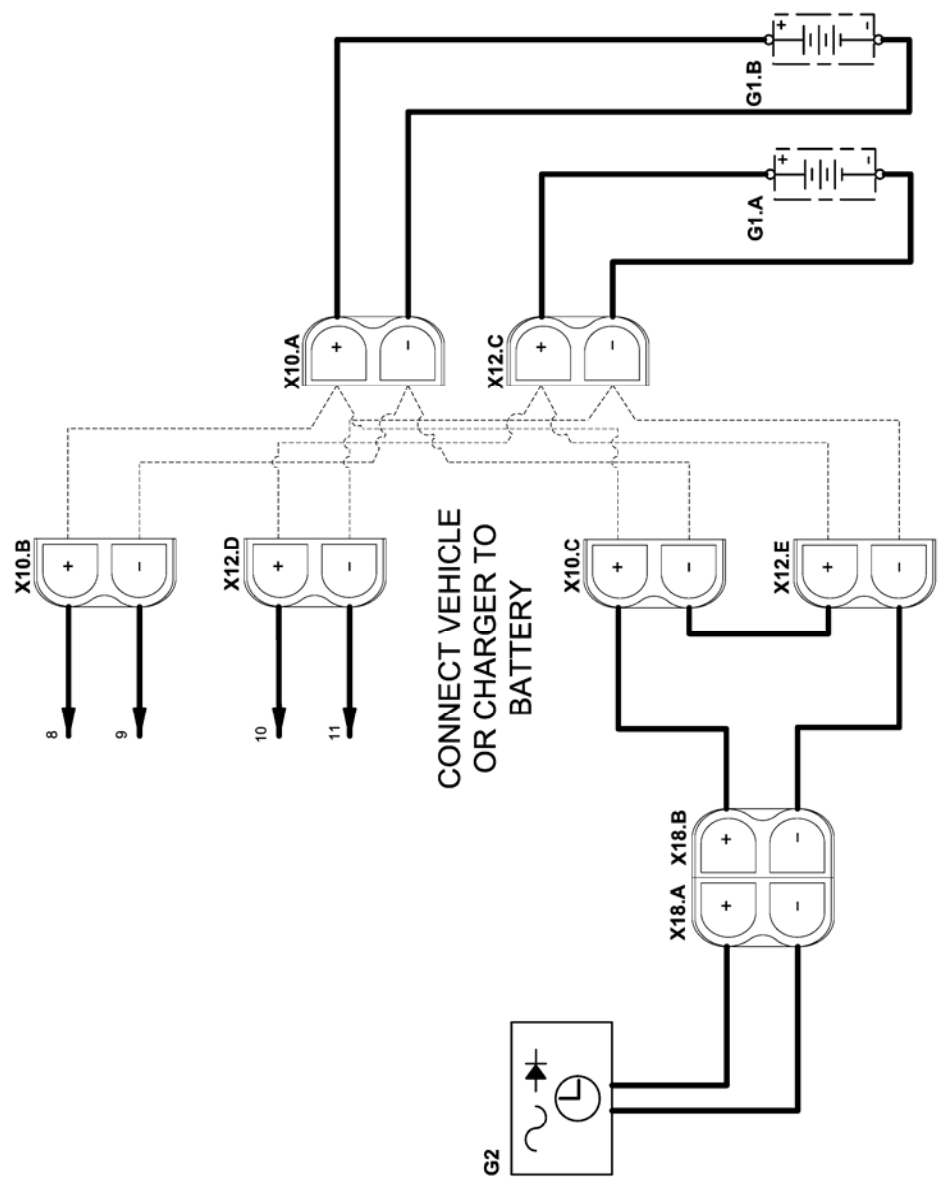
REF	PART NO	DESCRIPTION	REF	PART NO	DESCRIPTION
1	2120236001	DISC	13	2182480001	SHACKLE LINK
2	481431	RIGHT CALIPER	14	2185280001	FORD PLATE
	481430	LEFT CALIPER	15	2192320002	LEAF SPRINGS (5000 lbs cap.)
3	2121000005	BUSHING, LONG	16	2910000017	BOLT, LONG
4	2121000006	BUSHING, SHORT	17	2910000018	BOLT, SHORT
5	2122236001	MOUNTING PLATE, CALIPER	18	2916280002	U-BOLT 1/2-NF X 3 1/4" I.D.
6	2122300001	LEFT CALIPER SUPPORT	19	2916480001	U-BOLT 1/2-NF X 4" I.D.
	2122300002	RIGHT CALIPER SUPPORT	20		BOLT 5/8-NC X 4
7	2128000002	PADS	21		FLAT WASHER 12mm
8	2128000002	PADS	22		MACHINE SCREW 1/4-NC X 3/8
9	2129000001	CLIPS	23		NYLON NUT 5/8-NC
10	2134000001	FLEX. HOXE	24		HEAVY NUT 1/2-NF
11	2139000002	WASHER	25	2183240002	BUSHING
12	2139000003	BOLT			

ELECTRICAL DIAGRAM – SERIES MAIN CIRCUIT **DIAGRAMME ÉLECTRIQUE – CIRCUIT PRINCIPAL SÉRIES**



MOTREC INC.			
SUBJECT:	SERIES 1205X - CHARGER		
TITLE:	MAIN CIRCUIT-SERIES		
VERSION:	01	DATE:	2005-04-11
AUTHOR:	J. GAGNON	APPROVED:	
DRAWING #:	E-480SC.VSD		

ELECTRICAL DIAGRAM – CHARGER AND BATTERY
DIAGRAMME ÉLECTRIQUE – CHARGEUR ET BATTERIES

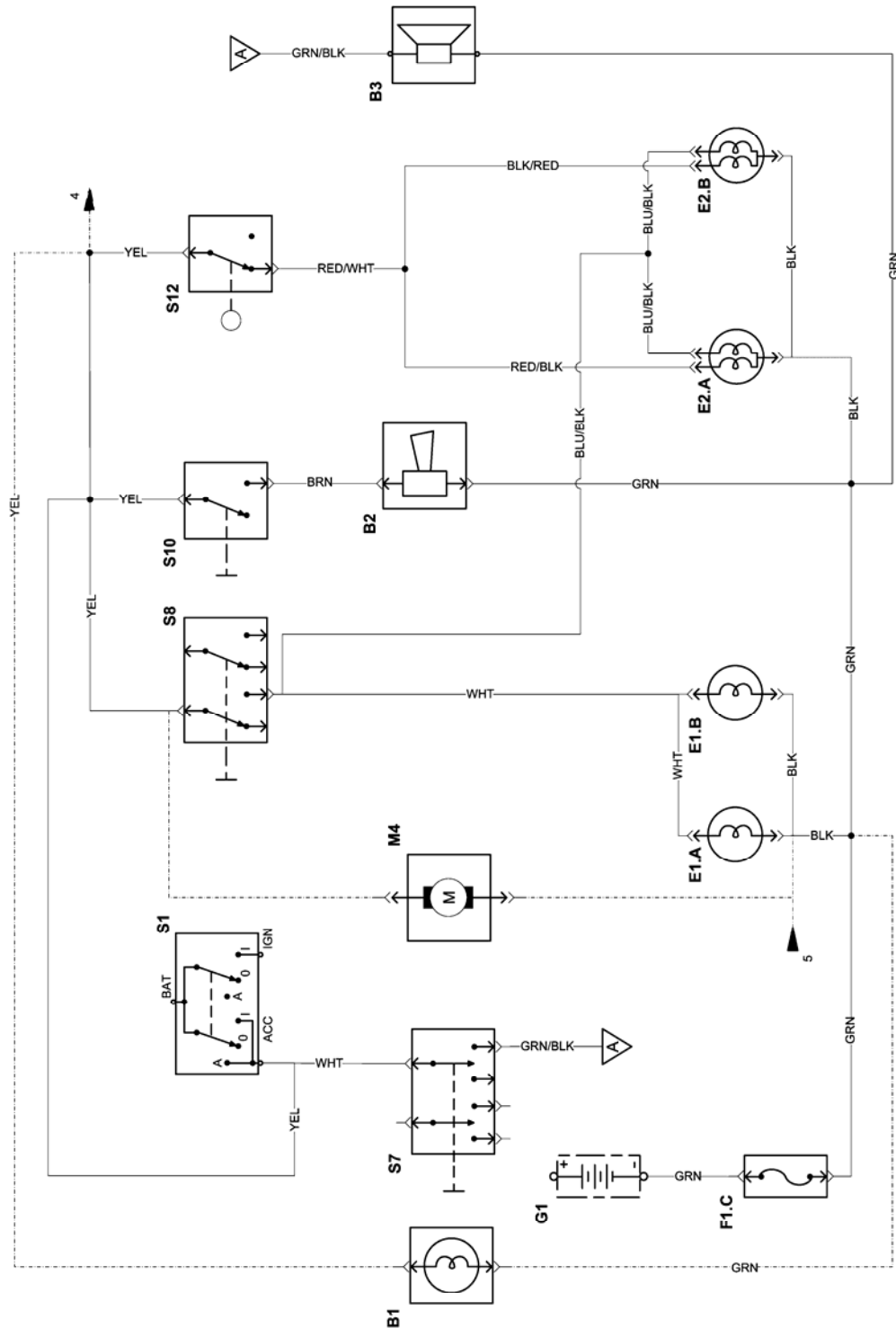


MOTREC INC.

SUBJECT:	SERIES 1205X - CHARGER		
TITLE:	BATTERY AND CHARGER		
VERSION:	01	DATE:	2006-04-07
AUTHOR:	J. GAGNON	APPROVED:	
DRAWING #:	E-480SC.VSD		

ACCESSORIES – NO DC/DC CONVERTER

ACCESSOIRES – SANS CONVERTISSEUR DC/DC

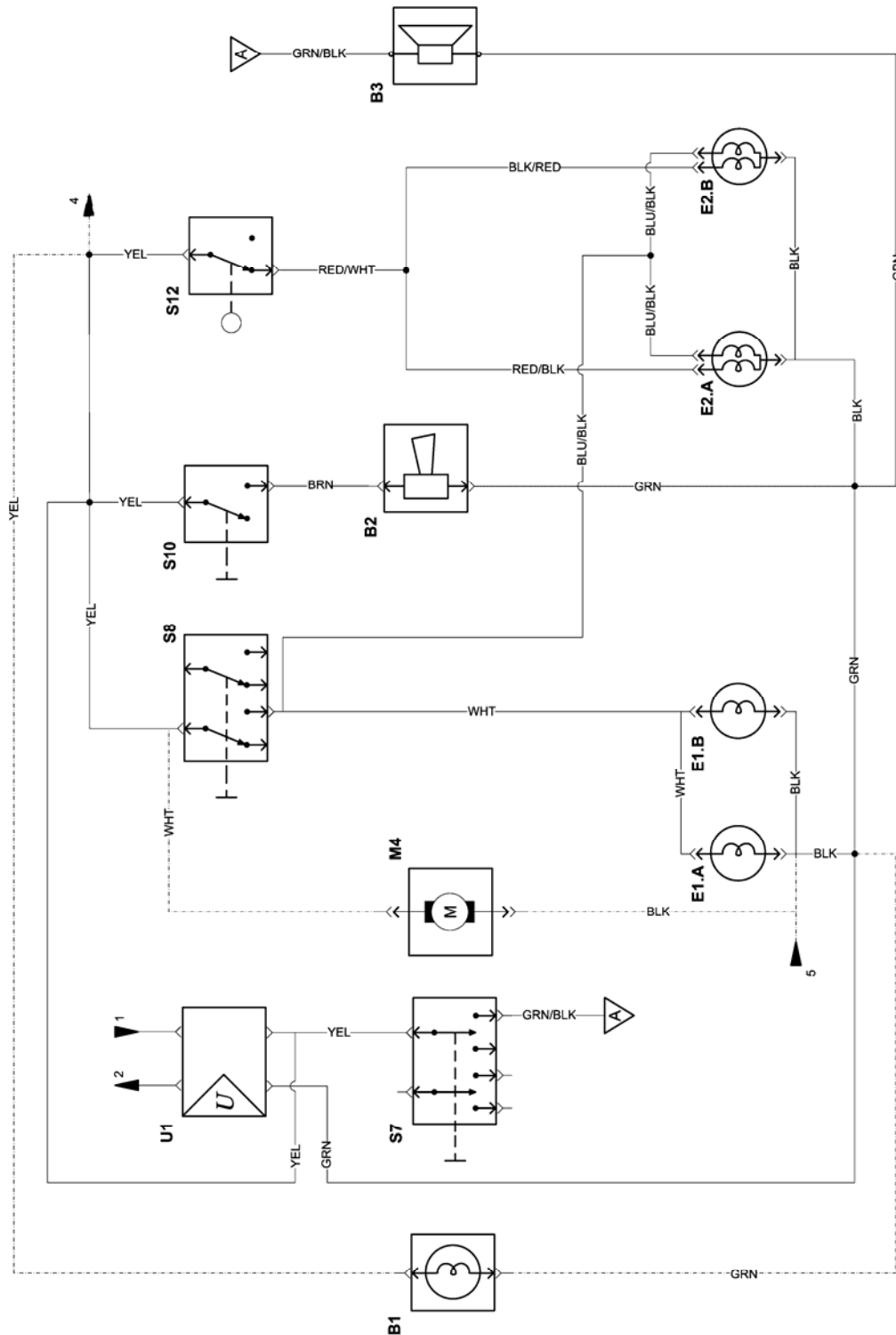


MOTREC INC.			
SUBJECT:	ACC - 2HL2TL1SL1WM		
TITLE:	ACCESSORIES - NO DC/DC CONVERTER		
VERSION :	01	DATE:	2006-04-08
AUTHOR :	J. GAGNON	APPROVED:	
DRAWING #	ACC - NO DC-DC - 2HL2TL1SL1WM.VSD		

* Accessories ground is connected at an intermediate post relative to vehicle battery set positive post when DC-DC converter option is not taken.
The relative voltage is either 12V or 24V depending on accessories

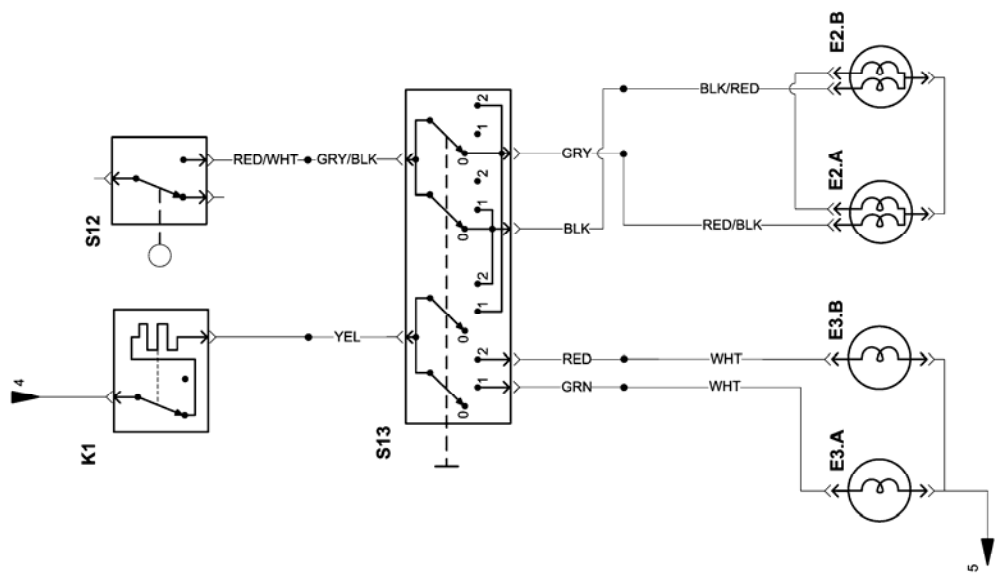
ACCESSORIES – DC-DC CONVERTER

ACCESSOIRES – CONVERTISSEUR DC-DC



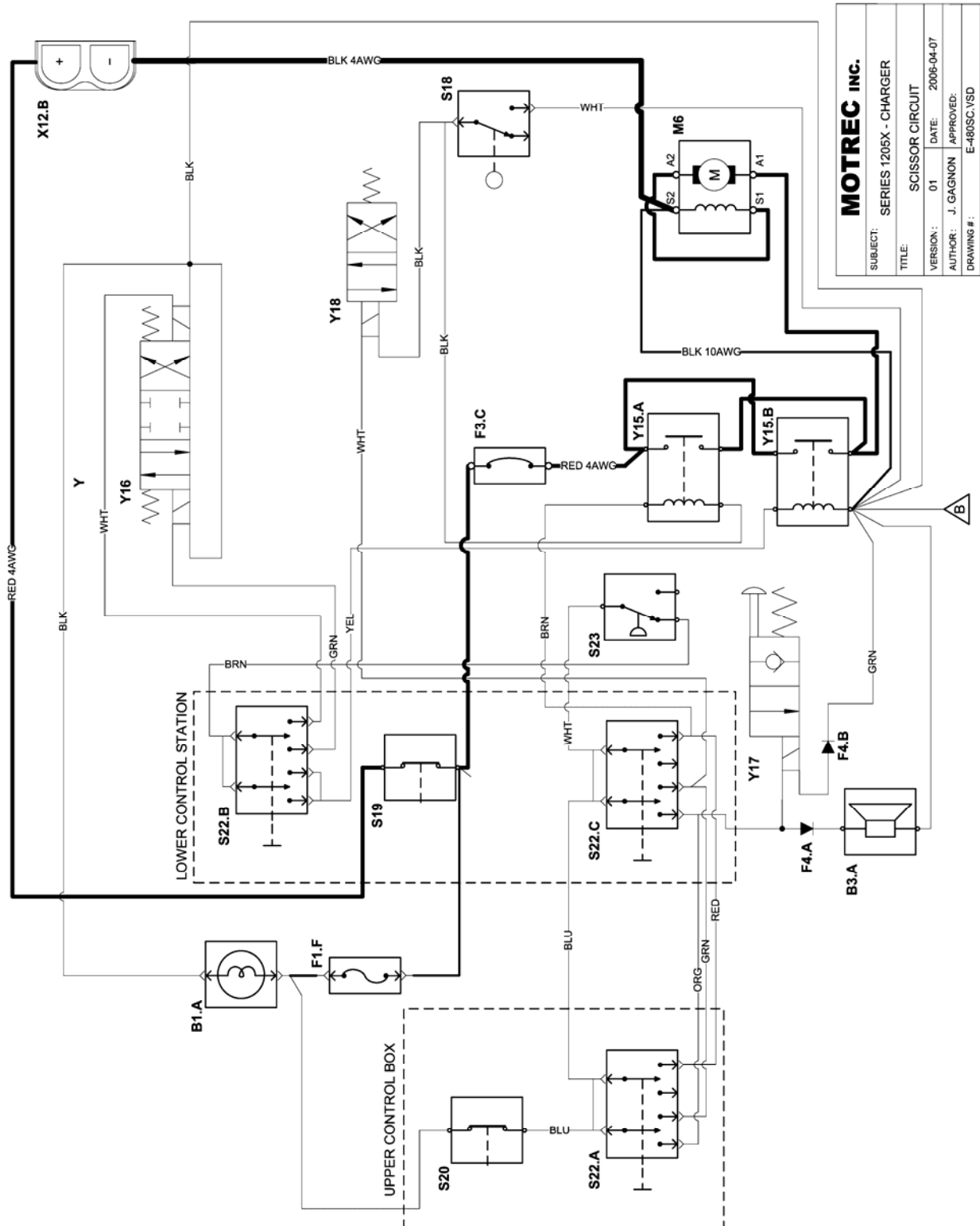
MOTREC INC.			
SUBJECT:	ACC - 2HL2TL1SL1WM		
TITLE:	ACCESSORIES – DC/DC CONVERTER		
VERSION:	01	DATE:	2005-04-27
AUTHOR:	J.GAGNON	APPROVED:	
DRAWING #:	ACC - DC-DC - 2HL2TL1SL1WM.VSD		

OPTIONS



MOTREC INC.			
SUBJECT:	OPTIONS - FLASHERS		
TITLE:	OPTIONS		
VERSION :	01	DATE:	2006-04-07
AUTHOR :	J. GAGNON	APPROVED:	
DRAWING #:	OPTIONS - FLASHERS.VSD		

SCISSOR LIFT - ELECTRICAL CIRCUIT **ÉLÉVATEUR À CISEAUX – DIAGRAMME ÉLECTRIQUE**



MOTREC INC.			
SUBJECT:	SERIES 1205X - CHARGER		
TITLE:	SCISSOR CIRCUIT		
VERSION:	01	DATE:	2006-04-07
AUTHOR:	J. GAGNON	APPROVED:	
DRAWING #:	E-480SC.VSD		

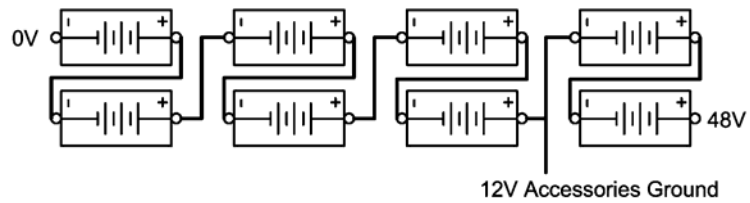
PARTS LIST

NO	DESIGNATION	REF	QTY
A4	SERIES SPEED CONTROL, 350A	1205X-5301	1
B1 & B1.A	STROBELIGHT	*	2
B2	HORN	*	1
B3 & B3.A	REVERSE & DOWN ALARM	*	2
E1.A,B	HEADLIGHT	*	2
E2.A,B	TAIL/BRAKE LIGHT	*	2
E3.A,B	AMBER FRONT LIGHT	*	2
F1.A,B,C,D,E,F	FUSE	246108K	5
F3.A,B,C	CIRCUIT BREAKER, 150A	2869001	3
F4.A,B	DIODE	367012	2
G1.A,B	BATTERY		
G2	BATTERY CHARGER		1
K1	FLASHER RELAY	3069004	1
M3	SERIES MOTOR		1
M4	WIPER MOTOR	*	1
M6	24 VDC MOTOR - PUMP	204050	1
P1	INDICATOR (BDI), HOUR METER	*	1
R1	ACCELERATOR	2142100001	1
	MICROSWITCH	367002	1
	POTENTIOMETER	367003	1
	PLASTIC GEAR	367015	1
	SPRING	2462008	1
S1	DPDT KEY SWITCH	4869011DP	1
	N.O. CONTACT	4869011CT	5
	DPDT KEY SWITCH BASE	4869011BA	1
S3	SEAT SWITCH, MICRO-SWITCH	3109100002	1
S7	FOWARD/REVERSE SELECTOR	266211	1
S8	LIGHT SWITCH, ROCKER TYPE	1269004	1
	LIGHT SWITCH, PUSH/PULL	486002	1
S10	HORN BUTTON	*	1
S12	BRAKE LIGHT SWITCH	246207	1
	HYDRAULIC BRAKE LIGHT SWITCH	3669004	1
S13	FLASHER SWITCH	*	1
S18	STAB LOCK SWITCH	4869010	1
S19	EMERGENCY PUSH BUTTON, 250A	4869015	1
S20	EMERGENCY PUSH BUTTON	4869012	1
S21	EMERGENCY PUSH BUTTON W CASE	3109000008	1
S22.A,B,C	TOGGLE SWITCH 2P2T	4874004WP	3
S23	PRESSURE SWITCH NC	4874001	1
U1	DC-DC CONVERTER	*	1
X1	HOUR METER CONNECTOR		1
X4	SPEED CONTROL CONNECTOR		1
X5	BATTERY CHARGER CONNECTOR		1
X10.A,B,C	BLUE CONNECTOR SB-175	SB-175B	3
X12.A,B,C,D,E	RED CONNECTOR SB-175	SB-175R	5
X18.A,B	BLUE CONNECTOR SB-350	SB-350B	2
Y1	48 VOLT MAIN CONTACTOR	486222	1
Y2.A,B	48 VOLT F/R CONTACTOR	486217	2
Y2.C,D	24/48V CONTACTOR	2469010	2
Y15.A,B	PUMP CONTACTOR	246112	2
Y16	STAB/UNSTAB SOLENOID	4874015	1
Y17	DOWN VALVE SOLENOID	4874003	1
Y18	UP VALVE SOLENOID	4874002	1
	F/R BUSSBARS	2469003	1

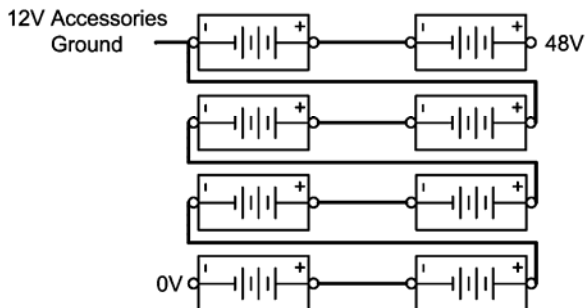
* Consult Motrec Illustrated parts

BATTERY CONFIGURATIONS - 48V CONFIGURATIONS DES BATTERIES – 48V

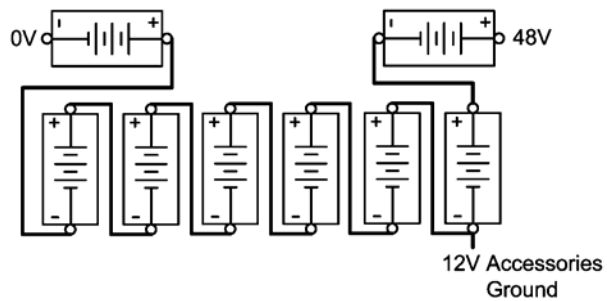
E-480
E-480TT
E-500

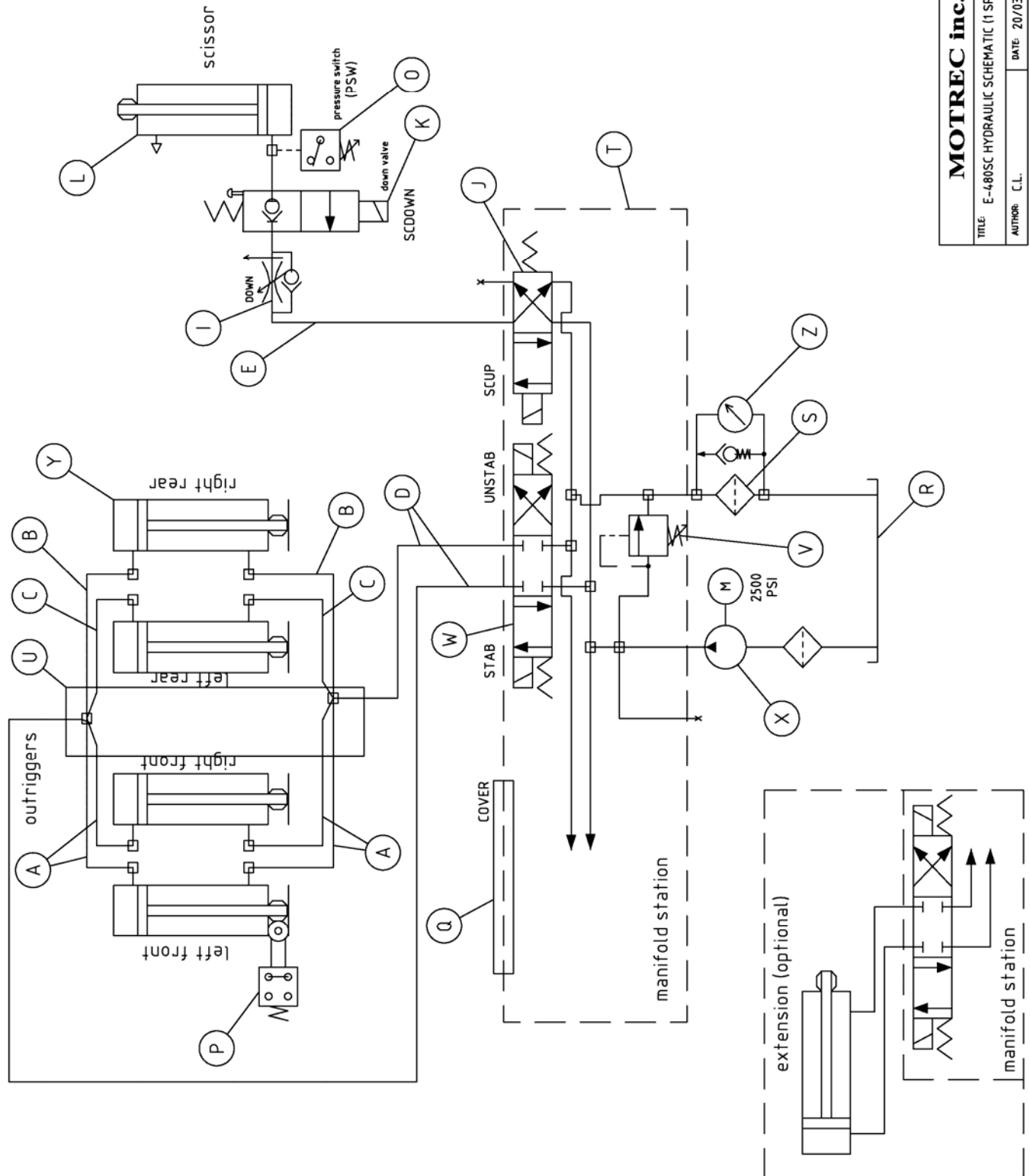


E-660



E-348





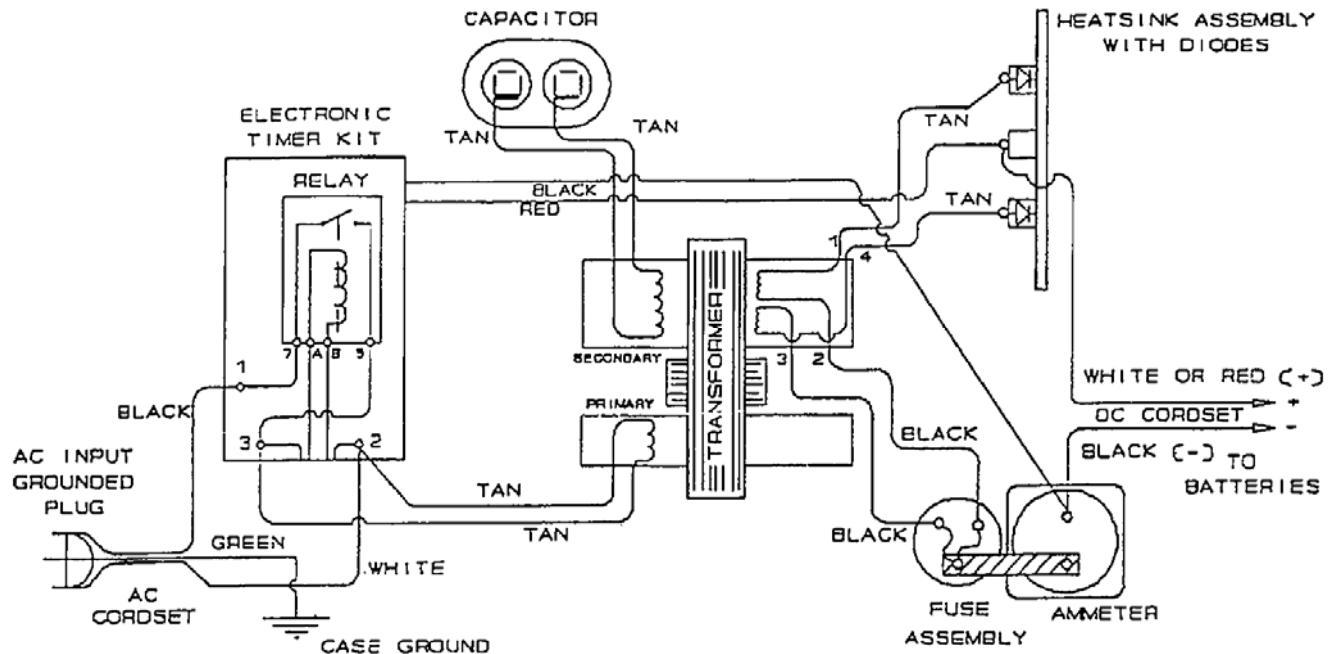
MOTREC inc.

TITLE: E-480SC HYDRAULIC SCHEMATIC (1 SPEED)

AUTHOR: C.L. DATE: 20/03/01

NO	DÉSIGNATION	REF	QTE
A	HOSE JIC 1/4 + (13943-4-4) X 2	-	4
B	HOSE JIC 1/4 + (13943-4-4) X 2	-	2
C	HOSE JIC 1/4 + (13943-4-4) X 2	-	2
D	HOSE JIC 1/4 + (13943-4-4) X 2	-	2
E	HOSE JIC 1/4 + (13943-6-6) X 2	-	2
F	FLOW CONTROL 3/8 NPT COMP	3674009	1
J	UP VALVE	4874002	1
K	DOWN VALVE	4874016	1
	BODY	4874012	1
	24V COIL	4874016	1
	MANUAL PULL CABLE	4874018	1
	SPRING	247019	1
L	CYLINDER 4 X 3 X 48	4871001	1
	BREATHER	4874011	1
M	MOTOR	204050	1
	ADAPTOR	4870002	1
	7/8 COUPLING	4870004	1
	5/8 COUPLING	4870003	1
	INSERT	4870005	1
O	PRESSURE SWITCH	4170480001	1
P	LEG, LIMIT SWITCH	4869010	1
Q	COVER PLATE	4874013	1
R	TANK BREATHER	4874019	1
	FLUID LEVEL GAUGE	4874005	1
S	FILTER	4874007	1
T	MANIFOLD	4874010	1
U	CONNECTING BLOCK	7070160	1
V	RELIEF VALVE	RPECLAV	1
W	VALVE 4/3 NC 24 VDC	4874015	1
X	PUMP	4870001	1
Y	CYLINDER 2 X 1 X 8	4871002	4
Z	FILTER PRESSURE GAUGE	VR	1
MOTREC inc.			
TITRE E-480SC HYDRAULIC SCHEMATIC (1 SPEED)			
DESSINE: C.L.		DATE: 20/03/01	

BUILT-IN / PORTABLE 25A CHARGER



Parts list for LESTRONIC II charger MODEL 09695 TYPE 48LC25-8ET 115 VAC 60 Hz

PART NO	DESCRIPTION
09727S	CASE ASSEMBLY
09696S	TRANSFORMER ASSEMBLY
16354S	HEATSINK ASSEMBLY, WITH DIODES
04127S	AMMETER
09664S	ELECTRONIC TIMER ASSEMBLY (RELAY - 03735S)
02390S	CAPACITOR, 6.0 MFD, 660 VAC
08776S	FUSE ASSEMBLY
02028S	BUSHING, 7W-2, INSULATOR FOR CORDSETS
02506S	CORDSET, AC
08512S	CORDSET, DC, NO PLUG
14973S	CORDSET, DC, WITH SILICONE PLUG
8020S	CORDSET, DC, WITH LESTER PLUG
08607S	CORDSET, DC, WITH 50 AMP ANDERSON PLUG
10536S	CORDSET, DC, WITH 50 AMP EZ GO PLUG
08224S	CORDSET, DC, WITH 175 AMP ANDERSON PLUG
08313S	PLUG ASSY, DC, 50 AMP ANDERSON PLUG
02957S	PLUG ASSY, DC, 175 AMP ANDERSON PLUG

MOTREC ILLUSTRATED ACCESSORIES

 Strobelight, polemount Amber 12-80V: 3116000001 Red 12-80V: 2469001 Blue 12-80V: 3690008	 Red Tail/Brake light Housing: 3069012R Bulb 12V: 3117240001	 Headlight Left: 3111480003 Right: 3111480004 Bulb H/L: 3117480001 Bulb Turn: 3117480003 Bulb Mark: 3117480002	 Horn button VIP 2330014
 Strobelight, cab mount Amber 12-48V: 3116250001 Red 12-48V: 3069026 Blue 12-48V: 3069014 Amber 72-80V: 3116720001 Red 72-80V: 3116720002 Blue 72-80V: 3116720003	 Back-up lamp Grommet: 3269001 12V: 3669012 24V: 3669012A	 Turn signal switch 246050	 Horn button, column mount 246210
 Amber turn lamp 12V: 3069020 Bulb 12V: 3069021	 Clear lamp 12V: 3069012 Bulb 12V: 1269008	 Analog Voltmeter 12V : 3069007 24V : 2469002 36-48V : 3669002	 Horn button, dash mount 266210
 Red Tail/Brake light Grommet: 3269001 Plug: 246012A 12V : 2469021 24V : 2469022	 Pedestral head lamp 12V: 2569001 Bulb 12V: 2569001B Bulb 24V: 4469001	 HOBBS Gauge 24V: 2469026 36V: 3069038 48V: 4869037	 Horn button 3109250001
 Red Tail/Brake light 12V: 386002	 Headlight Left: 3111480003 Right: 3111480004 Bulb H/L: 3111480006 Bulb Turn: 3111480008 Bulb Mark: 3111480007	 Horn 12V: 246003 24V: 246013	 Limit switch 3030015  Back-up alarm 12-48V : 3100000001 72-80V : 3105720001

DC-DC converter, 10A 12-48V: 3069019 DC-DC Converter, 25A 12-48V: 3124000002 72-80V: 3124880001 Wiper motor 12V: 3113000001 24V: 486211	Wiper arm 2800000001 Wiper blade 14" Blade: 2800000002 18" Blade: 2800000003 Pantograph wiper arm 246233A Pantograph wiper blade 246233	Cab heater 12V: 3103300001 36V: 3669008 48V: 4869020 12V Dome light 3669006 12V Fan 3669013	Headlamp 12V:3111250002 Headlamp 12V: 3111300001 Bulb 12V: 3111300002 Red Pilot light 12V: 246212 Bulb 12V: 246212B
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BATTERY DISCHARGE INDICATOR (HOBBS)

This indicator monitors :

- the residual capacity of batteries;
- operating hours;
- status of service down counter.

The residual capacity of the battery is monitored via an 8-LED bar display. When the left red LED lights, the batteries must be charged to avoid damage. The LED display starts flashing as a pre-warning signal. The lower voltage limit is adjustable via potentiometer “M” on the rear.

A	B	C	D	E	F	G	H	I	J	K
1,57	1,63	1,68	1,73	1,78	1,82	1,84	1,86	1,89	1,91	1,93

In order to activate a new adjustment, the unit has to be reset :

- 2.35V/cell reset voltage with battery remaining in vehicle;
- 2,09V/cell reset voltage after battery has been disconnected.

To maintain a good battery performance, it is recommended to limit the discharging to 80% of the battery capacity. The recommended setting for 6V batteries is F and the recommended setting for an industrial battery is K.

An internal relay can prevent overdischarging and damaging the batteries. The relay can be wired to cut off the reverse direction, or energize an N.C. relay and alarm.

Turning off and on the vehicle will override the protection for 30 sec.

The current status (remaining operating hours before maintenance) of the service down counter is indicated for a period of 5 seconds after the key switch is turned on. When it is down to 0, the display flashes. After the maintenance, reset the counter: depress the button “R” on the rear. The service counter is factory programmable only.

24V UNIT #: 2469026

36V UNIT #: 3069038

48V UNIT #: 4869037

2- Orange, key switch

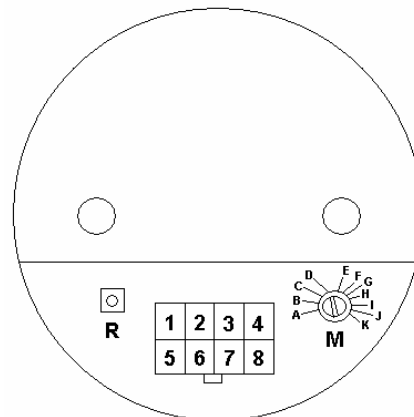
3- Relay +

4- Relay -

5- Black, battery –

6- Blue, hour counter

8- White, battery +



ADDENDUM

CURTIS FOOT PEDAL

